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ABSTRACT

Written for those responsible for designing jobs with career opportunities, this monograph is an outgrowth of the course "A Systems Approach To Task Analysis and Job Design." Major sections of the manual are: (1) Background and How To Read This Monograph, (2) How To Formulate Good Task Statements, (3) What You Can Do With Good Task Statements, (4) Scaes for Controlling the Language of Task Statements, and (5) Illustrations of Worker Function Scales With Selected Tasks From the Social Welfare Field. Included in the appendixes are: (1) A Scale of Worker Instructions and Scales of General Educational Development, and (2) The Role of Functional Job Analysis In Current Manpower Problems. (BH)

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Methods for Manpower Analysis No. 4

An Introduction to Functional Job Analysis

A Scaling of Selected Tasks From the Social Welfare Field

Sidney A. Fine

and

Wretha W. Wiley

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Methods for Manpower Analysis *No. 4*

AN INTRODUCTION TO FUNCTIONAL JOB ANALYSIS

A Scaling of Selected Tasks From the Social Welfare Field

By

SIDNEY A. FINE

and

WRETHA W. WILEY

September 1971

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The Authors

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From 1950 to 1959 Dr. Fine directed the development of the present occupational classification system of the United States Employment Service, which was the basis for the third edition of the *Dictionary of Occupational Titles* issued in 1965. Following his work at the Department of Labor, he was program director of rehabilitation research at St. Elizabeths Hospital in Washington and senior research scientist at Human Sciences Research, Inc. From 1965 to 1966 he was employed as a consultant by the International Labour Office in Geneva, Switzerland, to assist in the revision of the International Standard Classification of Occupations.

In 1959 the U.S. Department of Labor awarded Dr. Fine its Certificate of Merit. In the same year he received the American Personnel and Guidance Association's award for outstanding research. He is listed in *American Men of Science.*

Recent publications of Dr. Fine are concerned with the measurement of the impact of automation on skill, the design of new careers, the nature and potential of the *Dictionary of Occupational Titles,* and the nature of human performance.

Wretha W. Wiley joined the Institute staff as a senior staff member in April 1969 to assist in developing the Institute's training course, *A Systems Approach to Job Design and Manpower Utilization.* She is a specialist in job analysis, career design, and job training. She obtained a B.A. degree in English Literature from Hardin-Simmons University and pursued graduate work in the same field at Syracuse University.

From 1967 to 1969 Mrs. Wiley was a research analyst with the New Careers Development Center of New York University, where she applied the techniques of Functional Job Analysis to the problems of designing new entry-level, career-oriented jobs for unemployed and underemployed persons. Her duties involved analyzing work performed in the human service fields of health, education, and welfare to identify and define jobs and training for new careerists. Mrs. Wiley has written extensively on problems of career development and new careers training. She has also developed and conducted short training courses in Functional Job Analysis and career design for new careers program administrators.

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Foreword

This monograph is the third in a series of papers on functional job analysis and career design. The series is an outgrowth of the course "A Systems Approach to Task Analysis and Job Design," which the Institute offered for a brief period under the direction of Sidney A. Fine, and which it is continuing on a limited basis.

The Institute developed and conducted this course for specialists in manpower who were responsible for designing jobs with career opportunities in various federal manpower programs, such as New Careers and Public Service Careers. Participants in the course were trained in a systems analysis of organizations and in the designing of jobs from entry level, requiring little or no previous education and experience, to positions requiring the highest levels of skill and training.

This series of papers is being published to make the Institute course materials and methodology available to as many users as possible. A list of the published papers in this series appears on the inside front cover of this monograph. Two additional papers will be published in 1972.

The statements expressed in this paper are the sole responsibility of the authors. They do not necessarily represent the position of the W. E. Upjohn Institute for Employment Research.

Samuel V. Bennett
Director

Kalamazoo, Michigan
August 1971

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I. Background and How To Read This Monograph

Background

The idea for this monograph grew out of discussions with social welfare workers enrolled in the Upjohn Institute's training course, "A Systems Approach to Task Analysis and Job Design."[1] Participants in the course were responsible for a variety of personnel and management functions in their agencies, including policy and program planning; recruitment, selection, training, and supervision of workers; and job classification. They enrolled in the course primarily because they were under the pressures of new and difficult demands.

1. Some were attempting to follow a federal administrative requirement to plan for a "differential use of manpower" in their agencies to supplement the common two-level staffing pattern defined essentially by the B.A. and M.S.W. degrees. Their charge was to design a full range of jobs from the lowest level, which requires no previous training and experience, through intermediate levels to the highest level, which requires specialized and intensive education and experience.

2. Others were working in federal and state programs to hire, train, and upgrade disadvantaged individuals, particularly minority group members and former welfare clients, so that representatives of these groups would be assured of opportunities for advancement in public service careers.

In addition to these demands, which were authorized in policy, all participants felt, to some degree, mounting pressures from employees already working in their agencies to improve existing jobs

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[1]During 1969 and 1970 the Upjohn Institute conducted eight training sessions for some 160 representatives of state welfare agencies under the auspices of the American Public Welfare Association. The course was also conducted for some 60 representatives of the Social and Rehabilitation Services Division of the Department of Health, Education, and Welfare under a contract with the Office of Manpower Development and Training. In addition to the authors, the training team included Michael Batten, Charles Drew, and Robert Miller.

so that the job situation itself would provide for greater personal satisfaction, growth, and development of the worker. People who had assumed responsibilities for meeting these new requirements faced, by their own account, extremely difficult problems: (1) strategic problems such as insufficient time and money and resistance from professional welfare workers and their gatekeeping institutions, professional organizations, schools, and merit systems, and (2) technical problems such as lack of knowledge, techniques, and skill needed to effect the complex and thoroughgoing changes implied, if not explicitly stated, in their assignments.

As real and difficult as these problems were, participants recognized early in the course that they shared another problem, perhaps more fundamental than "a scarcity of resources and an abundance of resistance." When participants in the course were asked to describe their own work and the work of others in social welfare agencies, they found themselves in disagreement and confusion about what social welfare workers do and how to express those activities clearly and accurately. Since the design and construction of good jobs in an opportunity system require as their base a body of accurate information about what workers do, the confusion and disagreement among participants about how to describe the activities of workers in their field indicated the essential nature of the problem and where understanding and knowledge needed to begin.

This monograph, utilizing Functional Job Analysis, is a contribution to such a beginning. It is a revision and enlargement of the Functional Job Analysis manual used in the Upjohn Institute course. Functional Job Analysis (FJA)[2] is that part of the course which deals specifically with increasing the accuracy and preciseness of descriptions of what workers do. FJA, as taught in the course, however, is applicable to all work fields and is not, in itself, specific to social welfare. As participants in the course began to apply FJA to their problems, they suggested that a sample of social welfare tasks

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[2]Functional Job Analysis as an approach to job analysis was developed by Sidney A. Fine during the 1950's when he directed research at the United States Employment Service. Functional Job Analysis is the basis of the revised occupational classification system of the *Dictionary of Occupational Titles,* third edition, 1965.

associated with the FJA Scales would be useful to them both during and after training.

The authors have attempted to follow that suggestion in preparing this monograph. The training staff has reviewed and drawn upon the work of many trainees who are in the process of analyzing social welfare tasks in their states, including Utah, New Mexico, and Wisconsin. Task analyses made by a team of federal workers from the Community Services Administration of the U.S. Department of Health, Education, and Welfare (HEW) were also used. The social welfare tasks included here are intended to illustrate how FJA may be applied to the problem of describing what social welfare workers do. The result demonstrates how social welfare tasks can be expressed and compared in standardized and controlled language. It is the authors' hope that this monograph will help people in social welfare agencies discuss their staffing problems with greater preciseness and understanding and thereby facilitate the exchange of accurate information about job content as it affects workers, supervisors, managers, trainers, researchers, and classification specialists.

How To Read This Monograph

Part II discusses the task as the fundamental unit of work and the Worker Function Scales of Functional Job Analysis as controls on the language of job description. *It is suggested that the reader refer early and repeatedly to both the summary chart and the complete version of the Worker Function Scales (pages 31-41) as he reads Part II.* The summary chart of the scales is useful as an overview of worker function levels, giving the reader a quick reference and a general grasp of how the scales are organized. The complete scales (pages 32-41), which contain both functional levels and their definitions, give the reader a sense of how levels are differentiated to describe and measure what workers do from relatively simple (low-level) functions to relatively complex (higher level) functions.

Part III discusses the uses of tasks and worker functions in approaching the day-to-day problems of a personnel system. In this section the reader will be referred at appropriate points to the Scale

of Worker Instructions and the Scales of General Educational Development.

Part IV is comprised of the seven scales of Functional Job Analysis. It includes a summary chart of the Worker Function Scales (page 31) followed by the complete Worker Function Scales containing definitions of all the functions (pages 32-41). Part V contains a selected sequential list of social welfare tasks in each of the functional categories or levels of each scale.

A brief historical review of the development and application of Functional Job Analysis appears in the Appendix.

II. How To Formulate Good Task Statements

The Problem: Communicating Job Information

Over the past two years the authors of this monograph have trained manpower development, training, and management specialists in the social welfare field in "A Systems Approach to Task Analysis and Job Design." In each session participants have struggled with a question which goes to the heart of what they need to know in order to carry out their responsibilities. Simply stated, that question is: "What do social welfare workers do in their jobs?"

In their initial answers most participants made very similar statements. A social welfare worker:

- Interviews clients to determine their problems.
- Studies case histories and other records.
- Counsels and guides clients on problems of personal and social adjustment.
- Develops service or rehabilitation plans for clients.
- Follows up and assists clients in carrying out a service plan.

When participants were questioned further, however, on specifically what workers do when they *interview* or *counsel* clients, the similarities began to disappear. Some, for example, said that, when workers *interview and counsel,* they

> *talk with the client to obtain certain kinds of information about him and to give pertinent information to him, following a standard form and established procedures.*

Others, describing what workers do in *interviewing and counseling,* said that they

> *give encouragement, advice, and suggestions to the client — on a personal basis much like a peer or family member — on how to use community institutions or services appropriate to the client's situation.*

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Still others said that workers

> *serve as a source of technical information and help the client to define, clarify, or increase his understanding of his stated problems and his capacities for dealing with them.*

A few described what workers do as

> *working with the client on problems of overall life adjustment following clinical, therapeutic, or professional principles.*

While the language the workers used initially was almost identical, it soon became clear that words like "interview," "counsel," and "develop plans" had quite different meanings for different workers. And, in most cases, the different interpretations of what workers do suggested differences in the nature and level of the skills and knowledge required of workers. What appeared initially to be a common ground of understanding among participants was quickly eroded under an examination of the descriptive terms commonly used. The exposure of a wide range of interpretation and disagreement about what social welfare workers do was frustrating and confusing to participants but not, in itself, unexpected or necessarily serious. What was serious and more deeply troublesome, however, was the apparent lack of any kind of framework within which the participants could reasonably discuss, understand, and, to some degree, resolve their differences and disagreements.

The participants' concern about their differing interpretations and inability to resolve them did not have its roots in the philosophy and theory of social work. It sprang from very practical problems. Most of the participants had assignments in only one area of manpower management: recruitment and selection of workers, or training of workers, or supervision of workers, or classification of jobs. In addition to being responsible for only a part of a complex personnel management system, many did not have significant contact with workers at their stations through which they might acquire firsthand knowledge and test their assumptions about what workers were doing.

Experience had made them quite sensitive to the fact that the ef-

fective execution of their assignments depended upon their getting accurate, consistent information from colleagues working in all other areas. For example, staff development and training workers knew that they needed reliable information from supervisors on what workers are expected to do and the standards by which performance is evaluated in order to design sound training curricula. Recruitment and selection officers recognized that they needed accurate information from supervisors and trainers to develop selection criteria which would correspond to the actual job requirements. Similarly, wage and salary specialists were dependent upon clear, precise descriptions of what workers do to classify jobs for payment purposes. And staff responsible for program and policy were dependent upon accurate feedback from operations on how worker performance contributed to agency effectiveness in order to pinpoint program weaknesses and to institute modifications and adjustments.

Whether the participants could meet their responsibilities fully depended in large measure upon their developing *a means of ensuring accurate, consistently interpreted information* about what workers do and *a means of reliably comparing the skill and knowledge requirements* in a wide range of jobs. A means of controlling the language used to describe worker activity so that all the parts of a personnel operation will work from a common understanding was soon recognized to be an essential precondition for effective selection, training, and management of workers in social welfare agencies.

Getting Hold of the Fundamental Unit of Work: The Task

When social and rehabilitation workers describe what they do in *interviewing, counseling,* or *developing service plans,* they are referring to the broad processes in which they engage and objectives which they hope to achieve. "Counseling," for example, refers in a general way to a complex series of worker actions (and interactions between a worker and a client) directed toward the end of increasing a client's ability to cope with the conditions affecting his life. But the simple designation of the broad process, "counseling," encompassing many activities (which vary depending upon the result

expected, the approach and technique used, and the specific content of a particular case), simply does not yield enough information to be useful to people who must deal with practical problems in the daily operation of a personnel system. For example, to say that a worker must be able *to interview and counsel* clients does not give the trainer, the supervisor, the classification specialist, the recruiter, or even the worker himself any concrete information on what the worker actually does. To be sure, each person who hears the process name, "counseling," may — and does — subjectively interpret its meaning from his own point of view and experience. But it is likely that each interpretation will be different; and the system runs the risk of breakdown as the trainer trains from one understanding, the supervisor evaluates from another, the recruiter acts from still another, and the worker must — consciously or unconsciously — reconcile all these differing instructions and expectations with his own understanding of what he should be doing.

How then does one penetrate the confusion of differing interpretations and arrive at a uniform and consistent understanding of what workers are expected to do? Further, how does one articulate such an understanding in a job description that can serve the needs of worker, supervisor, trainer, and recruiter?

A beginning can be made by analyzing the language of most ordinary job descriptions. One quickly finds that the language of job descriptions has been used loosely and casually to serve a wide variety of purposes, but especially as a device for meeting individual and personal objectives such as justifying a desired status and/or pay level. In addition, job descriptions have tended to reflect management's emphasis on the results or outcome of a worker's performance with little attempt to delineate explicitly what the worker does.

When one begins to use explicit action verbs, rather than process names such as "interviewing and counseling," to describe worker behavior and, at the same time, makes an effort to distinguish between worker behavior (what the worker does) and the outcome of his behavior (the results expected to flow from the worker's action), a good deal of the confusion begins to disappear.

One is still faced, however, with the problem of how to state the

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worker action and its results and how to determine the limits of the statement. In effect, this problem raises the question: What are the fundamental units of work? A review of the areas of concern for personnel and management suggests that the basic unit which must be understood in order to describe jobs is the task.

- A job is made up of a series of *tasks.*
- Training is designed to enable a worker to perform a series of *tasks* in his job.
- Supervision of worker performance is based upon how well a worker performs assigned *tasks.*
- Recruitment and selection criteria are based upon the requirements or qualifications to perform specified *tasks.*
- Classification of jobs is based upon an assessment of the complexity of the *level of tasks* which make up the job.

It may seem obvious to the reader that tasks are the fundamental modules or units of job design, job performance, and job management. But what is a task? What are its structure and form? And how does one go about writing a task statement?

What is a task? The current definition of a task used in the Upjohn Institute course is one which has evolved over a number of years and in its present form reflects the "marriage" of the systems approach with Functional Job Analysis. It is as follows:

> A task is an action or action sequence grouped through time designed to contribute a specified end result to the accomplishment of an objective and for which functional levels and orientation can be reliably assigned.[1] The task action or action

[1]A task is derived from a system objective (that is, it is designed in the first place as a means of moving toward an objective) and when it is executed properly by a worker, the result of the task becomes an input to the accomplishment of that objective. The task analysis system described in this monograph is incorporated into the Upjohn Institute's training course, "A Systems Approach to Task Analysis and Job Design," which integrates systems analysis and task analysis and demonstrates their relationships and interdependence in designing and managing jobs. It is outside the limited scope and purpose of this monograph, however, to elaborate systems concepts and their application and uses. For a discussion of the relationship between systems analysis and job design, see Wretha W. Wiley and Sidney A. Fine, *A Systems Approach to New Careers: Two Papers* (Kalamazoo, Michigan: The Institute, 1969).

sequence may be primarily *physical,* such as *operating* an electric typewriter; or primarily *mental,* such as *analyzing* data; and/or primarily *interpersonal,* such as *consulting* with another person.

What are the structure and form of a task statement? The two most important elements of a task statement are:

1. The *action* the worker is expected to perform.

   Example: Asks questions, *listens to* responses, and *writes* answers on standard form.

2. The *result expected* of the worker action.

   Example: To record basic identifying information such as name, address, etc.

The worker action(s) phrase in the task statement describes as concretely as possible the worker's activity. The result phrase describes explicitly what his action is expected to produce or *what gets done* which identifies the worker's concrete contribution to a process or agency objective. While these two elements are the most critical in a task statement and can be thought of as the skeleton of a task, a task statement must include additional items of information to communicate clearly and consistently.

How does one go about writing a task statement? The following is a checklist of five questions which can be used in determining whether a task statement contains all the information needed and whether it can be consistently interpreted by operating people such as supervisors, trainers, and personnel officers.

1. Who? *(Subject)*

   The *subject* of a task statement is understood to be simply "worker." The task statement does not define what kind of worker.

   Example: A task statement contains no subject since it is always assumed to be "worker."

2. Performs what action?*(Action verb)*

   A task statement requires a concrete, explicit *action verb.*

Verbs which point to a process (such as *develops, prepares, interviews, counsels, evaluates,* and *assesses)* should be avoided or used only to designate broad *processes, methods,* or *techniques* which are then broken down into explicit, discrete action verbs.

Action: Asks client questions, *listens to* responses, and *writes* answers on standard intake form. . . .

3. To accomplish what immediate result?

   The purpose of the action performed must be explicit so that (1) its relation to the objective is clear and (2) performance standards for the worker can be set.

   Result: To record basic identifying information (items 1-8 on the intake form). The objective to which this result is directed is: To establish a client information system which enables workers to locate clients quickly and efficiently.

4. With what tools, equipment, or work aids?

   A task statement should identify the tangible instruments a worker uses as he performs a task; for example, telephone, typewriter, pencil/paper, checklists, written guides, etc.

   Tools: Form and pen.

5. Upon what instructions?

   A task statement should reflect the nature and source of instructions the worker receives. It should indicate what in the task is prescribed by a superior and what is left to the worker's discretion or choice.

   Prescribed content: Following standard intake form (items 1-8).

   Discretionary content: Exercising some leeway as to sequence of questions.

A completed, edited task statement, using the information generated and satisfying the five questions above might read:

Asks client questions, listens to responses, and writes answers on standard intake form, exercising leeway as to sequence of questions, in order to record basic identifying information (items 1-8).

When a task statement contains all the information called for by these five questions, it becomes operationally useful; that is, it provides clear information which

1. Managers can use to assess the level of complexity of the task and compare its performance requirements with other tasks.
2. Supervisors can use to give clear, accurate instructions to workers and develop criteria for assessing whether the worker's performance is satisfactory.
3. Selection officers can use to infer worker qualifications needed to perform the task.
4. Trainers can use to determine both classroom and on-the-job training needed by the worker to whom the task has been assigned.

Getting Control of the Language of What Workers Do: The Worker Function Scales

If an agency intends to employ workers with widely different levels of training, skill, and experience (or to plan for a differential use of staff), simply stating tasks to be performed is not enough. In addition to stating tasks, it is necessary to distinguish simpler (lower level) tasks from more complex (higher level) tasks. Job designers and managers must be able to identify levels of tasks so that they can delegate appropriate assignments to workers with no previous training and experience, to workers with some limited training and experience, and to workers with considerable specialized training, education, and experience.

Functional Job Analysis (FJA), which is both a conceptual sys-

tem for defining the dimensions of worker activity and a method of measuring levels of worker activity, provides a set of tools for establishing the levels of tasks.

For the limited purposes of this monograph, it is not important to explain in detail the theoretical aspects of FJA.[2] It is important, however, for the reader to keep continuously in mind that Functional Job Analysis is concerned with *what a worker does,* and not with the results of the worker's action or *what gets done.* The reader will recall that in the task example the *worker action* (or what the worker does) is:

Asks client questions, listens to responses, and writes answers on standard intake form.

The *result* of his action (or what gets done) is:

To record basic identifying information (items 1-8).

What Functional Job Analysis does is provide (1) a standardized, controlled language to describe *what workers do* and (2) a means of assessing and measuring the *level* and *orientation* of what workers do. As a tool for controlling the language of tasks and measuring their complexity, FJA can be described in terms of the following principles:

1. What workers do as they perform the tasks that make up their jobs, they do in relation to Data, People, and Things. All jobs involve the workers, to some extent, with information or ideas (Data), with clients or coworkers (People), and with machines or equipment (Things). Workers function in unique ways in each of these areas. For example, when a worker's task involves him with machines or equipment (Things), the worker draws upon his physical resources (strength, dexterity, motor coordination, etc.). When a worker's task involves him with information or ideas (Data), the worker calls his mental resources into play (knowledge, thought, intuition, insight, etc.). When a worker's task involves him with clients, customers, and

[2]For an overview of the history and theoretical framework of FJA, see the Appendix.

coworkers (People), the worker draws upon his interpersonal resources (empathy, courtesy, warmth, openness, guile, etc.). All jobs require the worker to relate to each of these areas and in doing so require him to draw upon his resources in each of these areas to some degree.

2. The concrete and specific actions workers perform in relation to Data, People, and Things as they execute different tasks can probably be described in an infinite number of ways; that is, there are as many specific ways of expressing what workers do in relation to Data, People, and Things as there are specific tasks to be performed or unique content and conditions to which to relate. While there may be an infinite number of ways of describing tasks, there is only a handful of significant patterns of behavior (functions) which describe how workers use themselves in relation to Data, People, and Things. Those patterns of behavior which can be articulated reliably have been defined in *Worker Function Scales,*[3] the primary tools of FJA, which provide a standardized, controlled language to describe what workers do in the entire universe of work.

   For example, in relation to information and ideas, a worker functions to *compare, compile, compute,* or *analyze* data.

   In interacting with clients, customers, and coworkers, workers *serve, exchange information, coach,* or *consult* with people.

   In using equipment, workers *feed, tend, operate,* or *set up* machines and *drive/control* vehicles.

   Although each of these worker functions is performed under widely varying conditions, occurs over a range of difficulty, and involves different specific content, each, within its scope, calls for similar kinds and degrees of worker characteristics to achieve effective performance.

3. The functions in each of the three areas of Data, People, and Things can be defined by a *Worker Function Scale,*[4] in which

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[3]See summary chart of Worker Function Scales (page 31).

[4]See complete version of Worker Function Scales (pages 31-41).

the performance requirements range from the simple to the complex in an ordinal scale. Because the scale is ordinal (that is, one in which any point on the scale includes lower levels and excludes higher levels), the selection of a specific function to reflect the requirements of a particular task indicates that the task includes the lower functions and excludes the higher ones. For example, on scanning the Worker Function Scale for Data, when one selects the *compiling* function as the appropriate worker behavior to describe the way a worker must relate to information in a given task, he is deciding two things: (1) that the worker's performance is more complex than *copying* and less complex than *analyzing*; and (2) that the worker must be able to perform all or at least comprehend all the data functions below *compiling,* but does not have to be able to perform or comprehend higher functions such as *analyzing* or *coordinating.*

4. The three hierarchies of Data, People, and Things functions provide two ways of systematically comparing and measuring the requirements of any task in any job. These two measures are *level* and *orientation.*

   The *level* measure indicates the relative complexity or simplicity of a task when it is compared to other tasks. The level is expressed by selecting the function that best describes the pattern of behavior in which the worker engages to perform a given task effectively. The ordinal position of the function is the level measure. For example, to say that a worker in dealing with the Data content of a task is *compiling,* one has indicated that he is functioning at level 3B on the Data scale, which requires a higher level of functioning than is required in *copying* information (level 2) but is a lower level of functioning than *analyzing data* (level 4).

   The *orientation* measure provided by FJA indicates the relative involvement of the worker with Data, People, and Things as he performs a given task. The reader will recall that the first concept of FJA is that the worker is not equally involved with all three in any task and that his relative involvement with any

of the three may change from task to task. For example, in performing one task in his job, a worker may be involved almost exclusively with Data; that is, something like 75 percent of his involvement and the resources he draws upon to perform a task are related to Data at the *compiling* level; but in order to accomplish the task, he must also be involved interpersonally in *exchanging information* with coworkers (perhaps 15 percent) as well as in calling upon physical resources in *handling* various documents, paper, and pen (10 percent). The worker's total functional involvement with Data (75 percent), People (15 percent), and Things (10 percent) adds up to 100 percent.

The orientation measure, then, is expressed by assigning a percentage in units of 5 or 10 to each of the three functions so that the total adds up to 100 percent. Note that these percentages are estimates. The reliability sought is in the pattern of the three estimates, not in the absolute amount of the estimates.

The orientation measure is a reflection of the performance requirements of a task. In the example above the estimates assigned must be in accord with the independent judgment that this task will be evaluated overwhelmingly on its data standards and quite lightly with regard to its people and things standards. The training the worker must have to perform the task should emphasize and build the mental skills required. The supervisor's instructions to the worker should emphasize and reflect the nature of the mental performance expected and the data standards by which the worker's results will be judged.

5. With the assignment to a given task of these two measures — level and orientation — the worker's total involvement with the specific content of his tasks — mentally, physically, and interpersonally — is obtained. Level and orientation are determined by selecting three functions, one from each of the three scales, most characteristic of the requirements of each task (yielding *level* measures). Each function is then weighted to show how much emphasis falls upon its requirements in the performance of the task (yielding *orientation* measures).

For the task example used previously,

> *Asks client questions, listens to responses, and writes answers on standard intake form, exercising leeway as to sequence of questions, in order to record basic identifying information (items 1-8),*

the level and orientation would be:

Area	*Functional Level*	*Orientation* (percent)
Data	Copying (2)	50
People	Exchanging Information (2)	40
Things	Handling (1A)	10

6. Since the level and orientation measures can be applied to all tasks and, by integration, to all jobs, the Worker Function Scales provide a means for comparing all tasks and all jobs on a common basis. This, of course, is a step forward from the situation where tasks cannot be compared because of the infinite number of ways of describing specific content.

Summary

If manpower specialists are to design viable jobs from *entry* to professional levels for their agencies, they need a base of accurate and comparable information describing what social welfare workers do. Such information is essential for day-to-day operations such as recruitment, selection, training, assignment, and supervision in order effectively to support and implement a career opportunity system. To develop such information requires two fundamental techniques:

1. Getting control of the fundamental unit of work and jobs — *the task.* The guidelines for writing task statements proposed here follow a specific form and structure and express what workers do and what gets done. The task statements answer specific questions by expressing explicit worker actions and their expected results along with an indication of work aids and instructions.

2. Getting control of the language of description using the *Worker Function Scales.* The three hierarchies of worker functions which define the simplest to the most complex worker behavior in relation to Data, People, and Things are a common language that makes it possible to reduce misunderstanding and inconsistency of interpretation among the many users of task information. In addition to controlling the language and meaning of what workers do, the Worker Function Scales allow one to compare what all workers do in terms of the level and orientation of their respective tasks. It is then possible to know how one task (or series of tasks) stacks up against other tasks — a vital point of departure for job design.

A good task statement, controlled by the designation of worker function levels and orientation, becomes the essential data from which it is possible to infer:

- Worker instructions.
- Performance standards.
- Training and education requirements.
- Selection criteria.

III. What You Can Do With Good Task Statements

Why must so much effort be expended in preparing and controlling task statements? Because without explicit task statements, it is practically impossible to draw reliable (consistent) judgments concerning how tasks should be assigned to get the expected results. Task statements, whether controlled or casual, are "loaded"; i.e., they are full of implicit meanings which can be elicited by worker and supervisor to suit their own ends. The purpose of controlled, explicit statements is to draw into the open as much as possible what is really meant and what is really expected, which brings us to the matter of worker instructions and performance standards.

A good task statement with its requisite functional levels and orientation can be extremely useful in the worker-supervisor relationship. A worker must have a clear idea of what he is expected to do and on what basis his performance will be judged. This information is usually communicated to him by a supervisor in an instruction — written or oral. To give good instructions, a supervisor must himself know clearly what is expected of the worker and be able to state those expectations fully and clearly. If the supervisor is working from task statements and an understanding of worker functions as described above, he has a substantial knowledge of what he wants done and what it takes to accomplish it. Such task statements provide him with a firm grasp of the worker action(s), the result of the action(s), the functional level and orientation at which the tasks must be performed, and an indication of the work aids to be used. This information alone can go a long way toward clarifying the worker's assignment, but it is not sufficient in and of itself. There are two additional aspects of worker instructions which are important. The worker needs to know what kind and how much freedom of choice he may exercise as he performs his task and by what standards his performance will be judged. In short, every worker, including the supervisor, needs to know what in his work is prescribed and what is discretionary.

Worker Instructions

Prescribed and Discretionary Components of Tasks

All tasks have prescribed and discretionary components.[1] The prescribed components of a task represent those areas where the worker has no choice over what he does. He is expected to follow the task's prescription because he is not authorized to do otherwise; in fact, if he did otherwise, he would be considered acting outside the limits of his authority. Prescription can be set on the worker actions (means) as well as on the results expected (ends).

The discretionary components of work consist of those areas of tasks where the worker is expected — in fact required — to use his own judgment in the planning and execution of his tasks. In other words, a worker's area of discretion is synonymous with his authority to make decisions in that area. In the task example we've been using:

> *Asks client questions, listens to responses, and writes answers on standard intake form, exercising leeway as to sequence of questions, in order to record basic identifying information (items 1-8),*

the worker actions (means) and results (ends) as well as the work aid (which defines the kind of information to be obtained) are prescribed. The worker is expected to use his own judgment or discretion in determining the order in which he asks the questions. It is obvious from the task statement itself that there is more prescription than discretion in this task. A more controlled assessment of the prescription and discretion mix can be obtained, however, by using a tool designed specifically for that purpose.

Scale of Worker Instructions

Functional Job Analysis includes a Scale of Worker Instructions[2]

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[1]The basic concepts of prescription and discretion were developed by Elliott Jaques. See his *Equitable Payment* (New York: John Wiley & Sons, 1961) for a full exposition of these concepts.

[2]Working independently of Elliott Jaques, Sidney A. Fine developed the Scale of Worker Instructions. When he later became familiar with Jaques' work, he realized that his scale had been intuitively based on the concepts of prescription and discretion and that he had actually scaled these two interdependent concepts.

for measuring the proportions of prescription and discretion in task performance (see pages 71-72). The scale is an ordinal scale similar in construction to the Worker Function Scales. The lower levels of the scale involve task instructions which have relatively higher prescription in proportion to the amount of discretion a worker is expected to use, while the higher levels represent task instructions containing relatively less prescription and proportionately more discretion.

The Scale of Worker Instructions is used in exactly the same way as the Worker Function Scales. For example, after reading the task statement carefully,

> *Asks client questions, listens to responses, and writes answers on standard intake form, exercising leeway as to sequence of questions, in order to record basic identifying information (items 1-8),*

one would read the definitions of the Scale of Worker Instructions to find which definition most accurately reflects the mix of prescription and discretion in the task. It is then evident that level number 1 is too low and level number 3 is too high, while number 2 seems to fit the description best. Therefore, the task statement should be assigned a worker instruction level of 2. It should be evident then that *explicitness in writing task statements includes information indicative of the instructions level of the task.* Such information brings into focus the functional level of the behavior (action involved).[3]

Once prescriptions are learned and understood, following them requires little or no judgment by the worker. They represent areas where the worker is not required or expected to use his own discretion; in fact, if he does not follow indicated prescriptions, he will be considered either negligent or insubordinate. Discretion does require mental effort. When a worker exercises his discretion, he must muster his abilities, skills, experience, and training and concentrate them on the task in hand, making decisions on the best way to execute his assignment. If he continually exercises good discretion,

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[3]Two workers can be observed performing the same task, but each can be working from a distinctly different level of instruction.

he expects to receive recognition eventually for good performance; but likewise, if he continually exercises poor discretion, he also expects to be found deficient eventually.

Jaques maintains that a worker's sense of responsibility is based on the amount of discretion that he must exercise in the tasks that make up his job, and that by adjusting the prescribed and discretionary balance of the tasks in a job, the job's level of responsibility can also be changed accordingly. In the context of career development, the discretionary aspect of a job is seen by the authors as the leading edge for individual growth.

Performance Standards

The worker is expected to know not only the prescription and discretion mix of his assignment but also the standards against which his performance will be judged. Performance standards are the criteria against which the results of a worker's tasks are assessed. Specification of performance standards is essential from both the worker's and the system's point of view. The worker needs to have a clear idea of the basis upon which his performance will be judged so that he personally can have a knowledge of results and judge the adequacy of his performance. Performance standards provide the worker with the information to make the necessary interim performance adjustments to his task to allow him to keep his overall task performance within satisfactory limits. From the agency's point of view, performance standards are necessary because they are the means by which the agency, through supervision, attempts to ensure that the results of the work of its individual workers are properly coordinated with its objectives. Theoretically, all tasks performed in an agency should contribute to its objectives; but unless the expected results and their respective performance standards are carefully thought out and specified beforehand, this will remain only a theoretical proposition. This is not possible without explicit, controlled task statements such as have been described.

Performance standards are of two types: descriptive and numerical.

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Descriptive Standards

Descriptive standards are performance criteria which are generally nonspecific and subjective; e.g., "please type this letter as quickly as possible"; "be reasonably accurate in checking these figures"; "don't spend too much time in compiling this report"; "be as complete as possible in collecting the information." They tell the worker in general terms how to proceed with his tasks, but the worker is required to provide his own interpretation about what his manager means by "as quickly as possible," "reasonably accurate," "don't spend too much time," etc.

The more experience a worker has in a given work situation, the better he is able to interpret correctly what his manager means; but there is always the possibility of an incorrect interpretation.

Numerical Standards

Numerical standards are objective performance criteria which require no interpretation. They usually take the form of numerical or categorical statements; e.g., "please have this letter typed by 5 p.m."; "please doublecheck these figures to ensure that there are no errors"; "please have this report compiled by next Monday at noon"; etc. Since they are objective, they explicitly communicate the standards by which the worker's performance will be assessed.

Determining Standards

Task statements prepared by using the FJA technique provide a basis for determining the standards of performance the worker must achieve to perform the task successfully. For example, using the task statement,

> *Asks client questions, listens to responses, and writes answers on standard intake form, exercising leeway as to sequence of questions, in order to record basic identifying information (items 1-8),*

the performance standards might be:

Descriptive Standards

– Writes answers legibly.

- Listens carefully to client's answers and records responses accurately.
- Easily changes sequence of questions to meet unique situations or problems.

Numerical Standards

- Asks *all* required questions of client (form 100 percent complete).
- On the average, completes *X* number of forms per day.
- No more than *X* complaints from clients per month about worker's manner during interview.

Note that the standards flow more or less naturally; that is, more or less according to common sense from the explicitness of the task statement and its worker function levels. In addition, the performance standards reflect the orientation measure. Recall that the task under consideration was oriented toward Data: *Copying* at 50 percent. The involvement with People was also substantial: *Exchanging Information* at 40 percent. The involvement with Things was minimal: *Handling* at 10 percent. These orientation measures indicate that there should be an emphasis on the standards associated with data functioning and only slightly less emphasis on standards associated with the worker's involvement with People. The way the worker handles the Things in the task is not important enough to call for evaluating this behavior.

Training Content

One of the most critical operational problems facing staff development and training specialists is how to determine what skills and knowledge are required to perform given tasks. Almost universally today in human services, workers and their supervisors question the adequacy and relevance of their training to meet the situations they face in practice. And almost universally there is gross inadequacy in the job descriptions and task statements which are supposed to serve as a primary basis for the development of effective training programs. What does a worker have to know and be trained to do in order to

perform his tasks according to the standards indicated? How and where will he acquire this knowledge? In a very fundamental sense the task statements produced by FJA are uniquely designed for curriculum specialists and staff developers. Functional levels and orientation, performance standards, and prescribed and discretionary levels for a task provide the information necessary to describe both the functional and specific content skill training needed to perform the task. What is meant by functional and specific content skill training?

Functional Skills refer to those competencies that enable an individual to relate to Things, Data, and People (orientation) in some combination according to his personal preferences and to some degree of complexity appropriate to his abilities (level). They include skills like tending or operating machines; comparing, compiling, or analyzing data; and exchanging information with or consulting and supervising people. These skills are normally acquired in educational, training, and avocational pursuits and are reinforced in specific job situations.

Specific Content Skills refer to those competencies that enable an individual to perform a specific job according to the standards required to satisfy the market. These skills are normally acquired in an advanced technical training school or institute, by extensive on-the-job experience, or on a specific job. These skills are as numerous as the specific products or services which they produce or the standards and conditions established by employers under which they are exercised.

The reason for the distinction between these two types of skills becomes apparent from their definitions.[4] They are acquired at different times and under different conditions, and too often the appropriate time and place for providing one is confused with the other. The confusion begins from the simple fact that functional

[4]Sidney A. Fine has elsewhere delineated the concept of three types of skills in order to comprehend better the nature of human performance. In addition to Functional and Specific Content Skills, he posits the need for defining and comprehending Adaptive Skills (see Appendix B, page 79). However, since Adaptive Skills *do not* have a direct relationship to task statements formulated using the FJA technique, they are not dealt with here. It should be noted, however, that Adaptive Skills are regarded as crucial for a worker's job satisfaction and individual growth.

skill training in schools must have *some* specific content, but this is no reason to assume that the specific content of a specific job situation is accounted for. Similarly, specific content training must draw on functional potential that has broader application than in the specific content of the particular job. Functional skills applicable to other jobs with similar requirements are being developed and should be recognized and credited.

Let's now apply this conceptualization of skills, along with the information we've previously generated, to the task example we've been working on. What are the Functional and Specific Content Skills needed by a worker to:

> *Ask client questions, listen to responses, and write answers on standard intake form, exercising leeway as to sequence of questions, in order to record basic identifying information (items 1-8). — Data: Copying, 50 percent; People: Exchanging Information, 40 percent; and Things: Handling, 10 percent.*

Some *Functional Skills* (related to the worker functions) required of a worker to perform this task would be:

- How to copy responses of client in answer to questions.
- How to ask questions and listen to responses in a patient, noninvestigatory manner.
- When, how, and why to vary the sequence of questions to meet specific problems; e.g., hostility, reticence, etc.

Some *Specific Content Skills* required of a worker to perform this task would be:

- Relationship of the task to the agency objective.
- Agency guidelines for interviewing clients.
- How to use standard intake form (content of items 1-8).

The above inferences of training requirements for the particular task under consideration can once again be seen to follow quite naturally from the task statement, functional controls (level and orientation), instructions, and performance standards.

Worker Qualifications

A problem cited frequently by personnel specialists is that of setting worker qualifications for jobs. How does one determine the education and experience *required* to perform the tasks that make up a job?

The most common means for establishing requirements (which then become qualifications) has been to set, on the basis of custom, competition, or availability in the labor market, a certain number of school years or a degree which workers must acquire to qualify for a given job. The hope is that an applicant who has completed the specified schooling will thereby be able to meet the job requirements. It is now more or less accepted that an individual's years in school often have little or nothing to do with whether he can perform certain tasks.[3] It is also widely acknowledged that arbitrary diploma or degree qualifications have screened out capable motivated applicants from minority and disadvantaged groups. The question raised by most selection officers has become: What do we substitute for years of school, diplomas, and previous experience as qualifications?

First, we have to know what we mean by "educational requirements" in relation to jobs. What we must know about the *educational attainment* needed to qualify workers for certain jobs is not so much how many years an applicant stayed in school but what levels of reasoning, language, and mathematical skills he has acquired regardless of where and how he acquired them. In the FJA system job requirements are determined by objective analysis as those which are necessary and sufficient to achieve average performance in the specific tasks of the job. By examining the tasks performed — their level, orientation, and performance standards in relation to reasoning, mathematical, and language requirements — qualification criteria can be generated which are independent of years of school completed.

The Scales of General Educational Development (GED) provide a tool for determining the basic educational skill requirements necessary to perform a job at specified Things, Data, and People functional levels. The Scales of GED embrace only those aspects of education,

[3]Ivar Berg, *Education and Jobs: The Great Training Robbery* (New York: Praeger Publishers, 1970).

formal and informal, which contribute to the worker's reasoning development and acquisition of functional knowledge of language and mathematics. Since these scales are functionally defined, they have a constant meaning and are independent of school grade attainment, which has a variable meaning. The scales may be used to express a job's requirements, a worker's demonstrated ability, or a worker's capacity (see Appendix A, pages 73-76).

The Scales of GED are comprised of three independent scales: a scale which measures reasoning development, a scale which measures mathematical development, and a scale which measures language development. The reasoning scale relates to concepts, problemsolving, making judgments, and carrying out instructions. The mathematics scale relates to arithmetic, algebraic, and geometric operations with numbers and associated symbols. The language scale relates to understanding, reading, writing, and speaking the words, expressions, idioms, and ideas of a specific language.

The Scales of GED, like the Worker Function Scales and the Scale of Worker Instructions, are ordinal hierarchies reflecting the lowest through the highest levels of development in each area. They are applied to tasks and jobs by selecting the highest level in each scale needed to meet the functional requirements of the task.

To complete the analysis of the illustrative task used throughout this monograph, one re-reads the task statement, its functional levels and orientation, the performance standards, and training requirements,

Task Statement

Asks client questions, listens to responses, and writes answers on standard intake form, exercising leeway as to sequence of questions, in order to record basic identifying information (items 1-8).

Area	*Functional Level*	*Orientation* (percent)
Data	Copying (2)	50
People	Exchanging Information (2)	40
Things	Handling (1A)	10

The task worker instruction level, then, is 2. The performance standards are:

Descriptive Standards

- Writes answers legibly.
- Listens carefully to client's answers and records responses accurately.
- Easily changes sequence of questions to meet unique situations or problems.

Numerical Standards

- Asks all required questions of client (form 100 percent complete).
- On the average, completes *X* number of forms per day.
- No more than *X* complaints from clients per month about worker's manner during interview.

The training requirements are:

Functional Skills

- How to copy responses of client in answer to questions.
- How to ask questions and listen to responses in a patient, noninvestigatory manner.
- When, how, and why to vary the sequence of questions to meet specific problems; e.g., hostility, reticence, etc.

Specific Content

- Relationship of the task to the agency objective.
- Agency guidelines for interviewing clients.
- How to use standard intake form (content of items 1-8).

Then one assigns a level number from each of the three Scales of GED which most accurately describes the reasoning, mathematics, and language requirements of the task:

Requirement	*Level*
Reasoning	2
Mathematics	2
Language	3

All the points of view from which to estimate a task's *requirements,* summarized above, provide all the information a selection officer needs to develop selection criteria and qualifications which accurately reflect, in human terms, what a worker needs to know and be able to do in performing an assigned task.

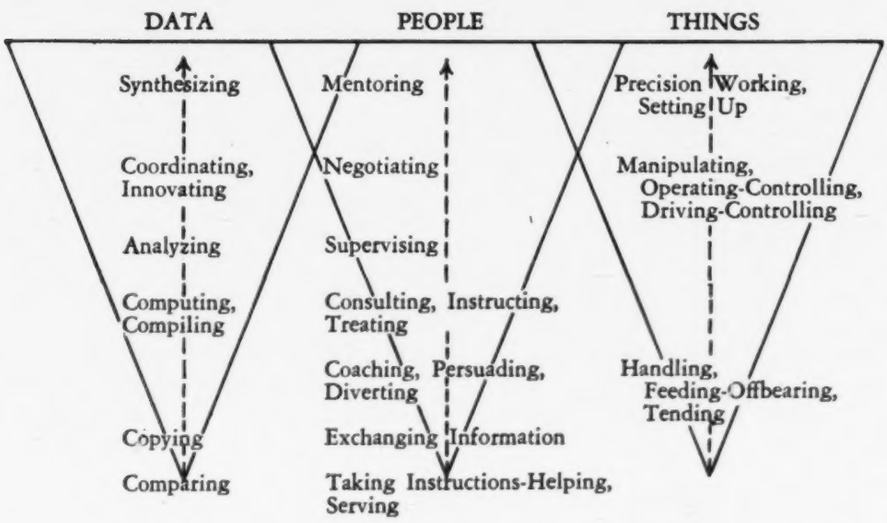
How does he develop this information from the worker? It is easy to say, "test him." Unfortunately, tests are unfair to many groups in our society because of the nature of their standardization. Furthermore, they often are not relevant to the work at hand. Hence, particularly for qualifying persons for entry-level jobs, we urge selection officers to place more emphasis on experience, interview behavior, and explicit performance evaluation — that is, a tryout on sample tasks in the jobs being recruited for.

Job Design

When all the tasks within an agency or a department are clearly stated and analyzed for performance standards, training content, prescription and discretion mix, and qualifications, an adequate information base is available for organizing tasks into jobs.

IV. Scales for Controlling the Language of Task Statements

Summary Chart of Worker Function Scales



Note: Each successive function reading down usually or typically involves all those that follow it. The functions separated by a comma are separate functions on the same level separately defined. They are on the same level because empirical evidence does not make a hierarchical distinction clear.

The hyphenated functions: *Taking Instructions-Helping, Operating-Controlling, Driving-Controlling,* and *Feeding-Offbearing* are single functions.

Setting Up, Operating-Controlling, Driving-Controlling, Feeding-Offbearing, and *Tending* are special cases involving machines and equipment of *Precision Working, Manipulating,* and *Handling,* respectively, and hence are indented under them.

Complete Version of Worker Function Scales

Data Function Scale

Data should be understood to mean information, ideas, facts, and statistics. Involvement with Data is inherent in the simplest job instruction in the form of recognizing the relationship of a tool to its function or the significance of a pointing instruction. Data are always present in a task even though the major emphasis of the task might be dealing with Things and/or People. Where Things are primarily involved, Data tend to show up as specifications. Where

People are primarily involved, Data tend to show up as information about objective events or conditions, information about feelings, or ideas that could be tinged with objective information and/or feeling. The Data Scale measures the degree to which a worker might be expected to become involved with Data in the tasks he is asked to perform from simple recognition through degrees of arranging, executing, and modifying to reconceptualizing the Data.

It is important to distinguish these functions in a work situation from those occurring in a learning situation. In a sense, every new learning involves synthesizing and hence all subsidiary functions — slowly or in a flash.

Data Function Scale

The arabic numbers assigned to definitions represent the successive levels of this ordinal scale. The *A, B,* and *C* definitions are variations on the same level. There is no ordinal difference between *A, B,* and *C* definitions on a given level.

LEVEL	DEFINITION
1	COMPARING Selects, sorts, or arranges data, people, or things, judging whether their readily observable functional, structural, or compositional characteristics are similar to or different from prescribed standards.
2	COPYING Transcribes, enters, and/or posts data, following a schema or plan to assemble or make things and using a variety of work aids.
3A	COMPUTING Performs arithmetic operations and makes reports and/or carries out a prescribed action in relation to them.
3B	COMPILING Gathers, collates, or classifies information about data, people, or things, following a schema or system but using discretion in application.

LEVEL	DEFINITION
	ANALYZING
4	Examines and evaluates data (about things, data, or people) with reference to the criteria, standards, and/or requirements of a particular discipline, art, technique, or craft to determine interaction effects (consequences) and to consider alternatives.
	INNOVATING
5A	Modifies, alters, and/or adapts existing designs, procedures, or methods to meet unique specifications, unusual conditions, or specific standards of effectiveness within the overall framework of operating theories, principles, and/or organizational contexts.
	COORDINATING
5B	Decides time, place, and sequence of operations of a process, system, or organization, and/or the need for revision of goals, policies (boundary conditions), or procedures on the basis of analysis of data and of performance review of pertinent objectives and requirements. Includes overseeing and/or executing decisions and/or reporting on events.
	SYNTHESIZING
6	*Takes off in new directions* on the basis of personal intuitions, feelings, and ideas (with or without regard for tradition, experience, and existing parameters) *to conceive new approaches* to or statements of problems and the development of system, operational, or aesthetic "solutions" or "resolutions" of them, typically outside of existing theoretical, stylistic, or organizational context.

People Function Scale

The substance of the live interaction between People (and animals) is communication. In the broadest sense the communication can be verbal or nonverbal. What gives communication its complexity is the heavy load that messages carry; e.g., Data in their objective and subjective forms — the way in which they are delivered (volume, tone, accompanying gesture, and the formal rules and informal customs that govern the context of the communication). Since there is a large subjective element on the part of both the sender and the receiver of a communication, it is very difficult to measure or to assign absolute values or primary importance to one or another type of information in the interaction.

What further complicates pinning down the nature of specific interpersonal behavior is that *affect* can serve as a *tool* for managing oneself in the interaction as well as the informational *substance* of the interaction. Affect, as information and as tool, can occur in the simplest as well as the most complex interactions. For example, affect expressed as a sulky manner, perhaps to gain attention or perhaps to express resentment on the part of an entry worker, can quickly become the informational substance of the interaction, when the supervisor asks nonreactively, "Don't you feel well?" and gets a positive answer, "No, I don't. My child is ill. I should be home!"

The functions in the People Scale deal with these complex questions only indirectly. The assumption of ordinality is somewhat more tenuous than in the Data and Things Scales and depends more heavily on role, status, and authority which are often associated with, but not necessarily a part of, skill. In effect, the functions try to capture the variety of interpersonal behavior *assigned* in various work situations and are more or less arranged, as in the other scales, according to the need, in general, to deal with increasing numbers of variables and with greater degrees of discretion. (The function least likely to fit this pattern is Supervising, which probably could have a scale of its own.)

Skill in dealing with People is undoubtedly as much an art as a methodology, and on every level it is especially necessary to delineate

the descriptive and numerical standards by which a function can be appraised in the task in which it occurs. This is true for the simplest function as well as the most complex. Admittedly, measurement in this area is in a primitive state, but significant beginnings have been made.

In delineating standards for People functions on different levels, one should especially note the cultural boundary conditions and how they moderate the expression of affect on all levels. We have in mind here the rules of courtesy in such a matter as Taking Instructions-Helping, diplomatic protocol in various types of Negotiating, and "rules" of behavior in patient-doctor Mentoring. These cultural boundaries undoubtedly have a very definite effect on the prescription and discretion mix of a particular functional level.

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People Function Scale

The arabic numbers assigned to definitions represent the successive levels of this ordinal scale. The *A*, *B*, and *C* definitions are variations on the same level. There is no ordinal difference between *A*, *B*, and *C* definitions on a given level.

LEVEL	DEFINITION
1A	TAKING INSTRUCTIONS-HELPING Attends to the work assignment, instructions, or orders of supervisor. No immediate response or verbal exchange is required unless clarification of instruction is needed.
1B	SERVING Attends to the needs or requests of people or animals, or to the expressed or implicit wishes of people. Immediate response is involved.
2	EXCHANGING INFORMATION Talks to, converses with, and/or signals people to convey or obtain information, or to clarify and work out details of an assignment within the framework of well-established procedures.
3A	COACHING Befriends and encourages individuals on a personal, caring basis by approximating a peer or family-type relationship either in a one-to-one or small group situation; gives instruction, advice, and personal assistance concerning activities of daily living, the use of various institutional services, and participation in groups.
3B	PERSUADING Influences others in favor of a product, service, or point of view by talks or demonstrations.
3C	DIVERTING Amuses to entertain or distract individuals and/or audiences or to lighten a situation.
4A	CONSULTING Serves as a source of technical information and gives such information or provides ideas to define, clarify, enlarge upon, or

LEVEL	DEFINITION
	sharpen procedures, capabilities, or product specifications (e.g., informs individuals/families about details of working out objectives such as adoption, school selection, and vocational rehabilitation; assists them in working out plans and guides implementation of plans).
4B	INSTRUCTING Teaches subject matter to others or trains others, including animals, through explanation, demonstration, and test.
4C	TREATING Acts on or interacts with individuals or small groups of people or animals who need help (as in sickness) to carry out specialized therapeutic or adjustment procedures. Systematically observes results of treatment within the framework of total personal behavior because unique individual reactions to prescriptions (chemical, physical, or behavioral) may not fall within the range of prediction. Motivates, supports, and instructs individuals to accept or cooperate with therapeutic adjustment procedures when necessary.
5	SUPERVISING Determines and/or interprets work procedure for a group of workers; assigns specific duties to them (delineating prescribed and discretionary content); maintains harmonious relations among them; evaluates performance (both prescribed and discretionary) and promotes efficiency and other organizational values; makes decisions on procedural and technical levels.
6	NEGOTIATING Bargains and discusses on a formal basis as a representative of one side of a transaction for advantages in resources, rights, privileges, and/or contractual obligations, "giving and taking" within the limits provided by authority or within the framework of the perceived requirements and integrity of a program.
7	MENTORING Works with individuals having problems affecting their life adjustment in order to advise, counsel, and/or guide them according to legal, scientific, clinical, spiritual, and/or other professional principles. Advises clients on implications of analyses or diagnoses made of problems, courses of action open to deal with them, and merits of one strategy over another.

Things Function Scale

Working with Things means literally the physical interaction with tangibles, including taken-for-granted items such as desktop equipment (pencils, paper clips, telephone, handstamps, etc.); blackboards and chalk; and cars. Physical involvement with tangibles such as desktop equipment, etc., may not seem very important in tasks primarily concerned with Data or People, but it is quickly apparent when handicap or ineptness occurs. An involvement with Things can be manifested in requirements for the neatness, arrangement, and/or security of the workplace. Workers who make decisions or take actions concerning the disposition of Things (tools, materials, or machines) are considered to be working mainly with Data, although they physically handle Things (e.g., records, telephone, and catalogs).

Things Function Scale

The arabic numbers assigned to definitions represent the successive levels of this ordinal scale. The *A, B,* and *C* definitions are variations on the same level. There is no ordinal difference between *A, B,* and *C* definitions on a given level.

LEVEL	DEFINITION
	HANDLING
1A	Works (cuts, shapes, assembles, etc.), digs, moves, or carries objects or materials where objects, materials, tools, etc., are one or few in number and are the primary involvement of the worker. Precision requirements are relatively gross. Includes the use of dollies, handtrucks, and the like. (Use this rating for situations involving casual use of tangibles.)
	FEEDING-OFFBEARING
1B	Inserts, throws, dumps, or places materials into, or removes them from, machines or equipment which are automatic or tended/operated by other workers. Precision requirements are built in, largely out of control of worker.
	TENDING
1C	Starts, stops, and monitors the functioning of machines and equipment set up by other workers where the precision of output depends on keeping one to several controls in adjustment, in response to automatic signals according to specifications. Includes all machine situations where there is no significant setup or change of setup, where cycles are very short, alternatives to nonstandard performance are few, and adjustments are highly prescribed. (Includes electrostatic and wet-copying machines and PBX switchboards.)
	MANIPULATING
2A	Works (cuts, shapes, assembles, etc.), digs, moves, guides, or places objects or materials where objects, tools, controls, etc., are *several* in number. Precision requirements range from gross to fine. Includes waiting on tables and the use of ordinary portable power tools with interchangeable parts and ordinary tools around the home, such as kitchen and garden tools.

LEVEL	DEFINITION
	OPERATING-CONTROLLING
2B	Starts, stops, controls, and adjusts a machine or equipment designed to fabricate and/or process data, people, or things. The worker may be involved in activating the machine, as in typing or turning wood, or the involvement may occur primarily at startup and stop as with a semiautomatic machine. *Operating a machine* involves readying and adjusting the machine and/or material as work progresses. *Controlling equipment* involves monitoring gauges, dials, etc., and turning valves and other devices to control such items as temperature, pressure, flow of liquids, speed of pumps, and reactions of materials. *Includes the operation of typewriters, mimeograph machines, and other office equipment where readying or adjusting the machine requires more than cursory demonstration and checkout.* (This rating is to be used only for operations of one machine or one unit of equipment.)
	DRIVING-CONTROLLING
2C	Starts, stops, and controls the actions of machines for which a course must be steered or guided in order to fabricate, process, and/or move things or people. Actions regulating controls require continuous attention and readiness of response. (Use this rating if use of vehicle is required in job, even if job is concerned with people or data primarily.)
	PRECISION WORKING
3A	Works, moves, guides, or places objects or materials according to standard practical procedures where the number of objects, materials, tools, etc., embraces an entire craft and accuracy expected is within final finished tolerances established for the craft. (Use this rating where work primarily involves manual or power handtools.)
	SETTING UP
3B	Installs machines or equipment; inserts tools; alters jigs, fixtures, and attachments; and/or repairs machines or equipment to ready and/or restore them to their proper functioning according to job order or blueprint specifications. Involves primary responsibility for accuracy. May involve one or a number of machines for other workers or for worker's own operation.

V. Illustrations of Worker Function Scales With Selected Tasks From the Social Welfare Field

Data Function Scale

Data should be understood to mean information, ideas, facts, and statistics. Where Data are not involved in a major way, note that they are at least present in the details of the job instruction. (See section IV for a more complete statement about Data.)

LEVEL	DEFINITION
	COMPARING
1	Selects, sorts, or arranges data, people, or things, judging whether their readily observable functional, structural, or compositional characteristics are similar to or different from prescribed standards.
	ILLUSTRATIVE TASKS
1.1	Looks for/identifies prescribed mark on public assistance applications, sorting/separating applications marked "accepted" from applications marked "denied," in order to prepare them for filing/routing (TB 001).*
1.2	Selects/pulls specified client's case record folder from file in order to hand-route record to staff member ordering it (TB 002).
1.3	Likens/contrasts/checks off information in specified categories on application form against list of specific eligibility criteria to signify whether client is within prescribed limits (TB 003).

*These tasks were developed with the assistance of other members of the training staff: Michael D. Batten, Robert L. Miller, and Janice A. Woodward. TB numbers following illustrative tasks are numbers used in the Upjohn Institute Task Bank. Each of the tasks in this section appears on a McBee keysort card notch-coded on the edge for rapid information retrieval. In addition to the task statement the card contains information such as performance standards and training content as well as ratings on the seven scales. Space is also provided for systems (goals and objectives) and administrative information relevant to the particular task. The Upjohn Institute has a limited number of Task Banks for sale.

LEVEL	DEFINITION
	COPYING
2	Transcribes, enters, and/or posts data, following a schema or plan to assemble or make things and using a variety of work aids.
	ILLUSTRATIVE TASKS
2.1	Writes/fills in name and address of specified client and time of appointment from schedule book to standard form in order to prepare notice of appointment for mailing (TB 004).
2.2	Transcribes/writes/enters specified information from application form to case record form in order to set up case record (TB 005).
2.3	Asks questions/listens to/transcribes/writes client's answers to specified items on application form in order to record basic identifying information (TB 006).
2.4	Visually inspects applicant files, noting missing information and indicating this on form letter, in order to have applicant provide this information by return mail (TB 007).
2.5	Scans (visually inspects) printout of Medical Claims Audit List, listing (writing out) names of individuals who have filed more than X different drug claims in any one month, in order to list possible excessive users of drugs (TB 008).

LEVEL	DEFINITION
	COMPUTING
3A	Performs arithmetic operations and makes reports and/or carries out a prescribed action in relation to them.
	ILLUSTRATIVE TASKS
3A.1	Adds/totals figures in income categories on public assistance application form in order to record gross family income (TB 009).
3A.2	Multiplies estimated daily carfare by number of working/training days in month in order to record monthly travel allowance of client in training program (TB 010).
3A.3	Calculates percentages of grant allocated for rent, utilities, food, and clothing, following prescribed budget formula, in order to check/record distribution of money among budget categories (TB 011).

LEVEL	DEFINITION
	COMPILING
3B	Gathers, collates, or classifies information about data, people, or things, following a schema or system but using discretion in application.
	ILLUSTRATIVE TASKS
3B.1	Searches for/brings together/collects agency records (financial, legal, medical, etc.) on specified client in order to assemble sources of information to supplement/corroborate information on application form (TB 012).
3B.2	Reads/scans city street map, selecting, according to estimated closeness to client's home, those agencies listed on referral guide which deliver services requested by client, in order to list available, convenient services (TB 013).
3B.3	Classifies/assigns/arranges, by categories of services offered, agencies listed in community services catalog in order to prepare services referral guide (TB 014).
3B.4	Visually checks inventory of foodstuffs, suggested menus, and household supplies in home, using discretion as to need, quantity, and brand; and noting those items which must be purchased for meal preparation and house maintenance, in order to prepare (write) shopping list (TB 015).
3B.5	Informs child caretaker of the decision for type of exam needed by child and reviews with caretaker arrangements necessary to obtain it in order that caretaker may make appointment with appropriate doctor/health facility (TB 016).
3B.6	Writes/composes letter to physician, following agency procedures and, as necessary, using agency resources for clarification, in order to request information concerning recipient's use of medical services (TB 017).
3B.7	Asks questions; listens to responses of complainant, clarifying vague emotionally charged statements about complaint; and records information on form questionnaire in order to specify source, nature, and scope of the complaint (TB 018).

LEVEL	DEFINITION
	ANALYZING
4	Examines and evaluates data (about things, data, or people) with reference to the criteria, standards, and/or requirements of a particular discipline, art, technique, or craft to determine interaction effects (consequences) and to consider alternatives.
	ILLUSTRATIVE TASKS
4.1	Evaluates/assesses urgency of client's presented problem, judging circumstances reported and client's behavior/emotional state in relation to general agency guidelines, in order to decide whether case requires emergency or routine handling (TB 019).
4.2	Examines/evaluates primary and collateral information in case record in order to infer and write statement describing nature of problem, its major elements and their relationships, and client's and agency's capacities for mitigating or solving problem (TB 020).
4.3	Examines/evaluates/judges (1) relative merits of supportive and contradictory statements and (2) evidence or positions offered as evidence by complaining client/witnesses and by agency in fair hearing proceeding in relation to written policies, procedural manuals, and legal precedents in order to decide and write opinion on disposition of complaint (TB 021).
4.4	Evaluates/assesses seriousness of child's injury (cut, scrape, or fall), empathizing with and calming child; and judging circumstances reported, child's behavior, and appearance of wound in relation to First Aid guidelines and to instructions from parent, in order to determine whether child needs professional (physician's) treatment or home aid (TB 022).
4.5	Composes/writes procedures for filling out standardized report form, using the existing form as a guide, in order to give field workers guidance in filling out form (TB 023).

LEVEL	DEFINITION
4.6	Explains/describes rationale of tentative treatment plan to co-workers, inviting and responding to questions, objections, and suggestions for change, in order to obtain colleagues' critique and opinions on the plan and recommendations for improvement (TB 024).
4.7	Evaluates information gained from interview with parents, observation of home conditions, case record, and precedents, checking information with colleagues or collateral sources as needed, in order to decide whether to proceed with or discontinue child placement plan (TB 025).
4.8	Evaluates data obtained from home visit in relation to other facts (results of psychological exams, etc.), drawing on knowledge of similar cases and advice/recommendations of others (coworkers, etc.); and summarizes in outline fashion key facts in order to establish a working, tentative treatment plan (TB 026).
4.9	Reviews and analyzes available data (written literature; oral and written reports) relevant to a proposed project, such as introducing "Management by Objectives," on request of Deputy Commissioner in order to prepare report to him on feasibility of the proposed project (TB 027).
4.10	Calculates/performs statistical analysis on population movement within state's correctional facilities, using a desk calculator, in order to compute data to be used in report requested by Bureau Director (TB 028).
4.11	Reviews/inspects application for tuition reimbursement, checking merit system test scores, college transcripts, references, interview data, course descriptions, and other available data, in order to determine whether applicant meets minimum standards and can be approved for tuition reimbursement (TB 029).

LEVEL	DEFINITION
	INNOVATING
5A	Modifies, alters, and/or adapts existing designs, procedures, or methods to meet unique specifications, unusual conditions, or specific standards of effectiveness within the overall framework of operating theories, principles, and/or organizational contexts.
	ILLUSTRATIVE TASKS
5A.1	Decides/makes changes, modifications, or adjustments in a sequence of agency procedures/operations in order to bring agency practice into compliance with federal regulations, standards, or court order (TB 030).
5A.2	Devises and installs special accounting system and related procedures, forms, and manuals for agency in which standardized systems are not applicable, based upon analysis of agency needs and federal/state regulations, in order to guide activities of bookkeeping and clerical personnel who maintain the system (TB 031).

LEVEL	DEFINITION
	COORDINATING
5B	Decides time, place, and sequence of operations of a process, system, or organization, and/or the need for revision of goals, policies (boundary conditions), or procedures on the basis of analysis of data and of performance review of pertinent objectives and requirements. Includes overseeing and/or executing decisions and/or reporting on events.
	ILLUSTRATIVE TASKS
5B.1	Writes/draws up sequence of steps or procedures by which client may achieve specified result or goal, adapting and modifying plan as changes in situations require, in order to record individual case plan and monitor client's progress (TB 032).
5B.2	Determines/decides on scope of activity, component phases and results expected, time frame, and staff and budget allocations in order to write and execute plan for research and demonstration project (TB 033).
5B.3	Reviews/assesses tentative treatment plan outline, referring to recommendations of both colleagues and clients; and writes in adjustments/changes, using discretion as to need, in order to formulate a final treatment plan (TB 034).

LEVEL	DEFINITION
	SYNTHESIZING
6	*Takes off in new directions* on the basis of personal intuitions, feelings, and ideas (with or without regard for tradition, experience, and existing parameters) *to conceive new approaches* to or statements of problems and the development of system, operational, or aesthetic "solutions" or "resolutions" of them, typically outside of existing theoretical, stylistic, or organizational context.
	ILLUSTRATIVE TASKS
6.1	Conceives, intuits, explores relationships, and integrates selected theories and techniques from outside social work discipline with accepted social work practice in order to develop/test a new problem-solving process for multiproblem family (TB 035).
6.2	Conceptualizes and intuits (without documented precedents) new relationships between existing and evolving analytic theories and techniques for examining an organizational problem in order to develop an approach and methodology for demonstration project or for research model (TB 036).
6.3	Conceives, intuits, and expresses an original hypothesis concerning the nature of social-psychological problems of an ethnic or socioeconomic group in our society in order to explain factors and phenomena previously unrecognized or unaccounted for (TB 037).

People Function Scale

In jobs where People are not involved in a major way, note that they are at least represented by supervision. (See section IV for a more complete statement about People.)

LEVEL	DEFINITION
	TAKING INSTRUCTIONS-HELPING*
1A	Attends to the work assignment, instructions, or orders of supervisor. No immediate response or verbal exchange is required unless clarification of instruction is needed.
	SERVING
1B	Attends to the needs or requests of people or animals, or to the expressed or implicit wishes of people. Immediate response is involved.
	ILLUSTRATIVE TASKS
1B.1	Listens to and responds to child's request for glass of water and helps him to hold cup in order to meet his expressed need (TB 101).
1B.2	Attends to requests of aged residents for assistance in seating or rising from dining table in order to facilitate movement of residents (TB 102).
1B.3	Observes and responds to gesture request of crippled or mute patient for adjustment of body/bed position in order to make the patient comfortable (TB 103).

*No illustrative tasks are provided for this function because no one is hired merely to take instructions; all workers, however, act upon instructions. The conceptual problem here is currently being researched.

LEVEL	DEFINITION
	EXCHANGING INFORMATION
2	Talks to, converses with, and/or signals people to convey or obtain information, or to clarify and work out details of an assignment within the framework of well-established procedures.
	ILLUSTRATIVE TASKS
2.1	Asks client questions and listens to and records answers on standard housing information form (size of family, number of bedrooms needed, income preferences for location and type of housing, preferred moving date), exercising discretion as to sequence of questions, in order to obtain information on client's housing needs and problems (TB 104).
2.2	Describes/explains/answers client's questions about eligibility, procedures, and allowances of food stamp program, using agency guide and allowance tables, in order to inform applicant of his eligibility and allowance (TB 105).
2.3	Talks to/converses with/asks questions of job applicant certified on the merit register, using agency job descriptions and guidelines, to obtain further information about applicant in order to decide whether applicant is suitable for specific job opening (TB 106).

LEVEL	DEFINITION
	COACHING
3A	Befriends and encourages individuals on a personal, caring basis by approximating a peer or family-type relationship either in a one-to-one or small group situation; gives instruction, advice, and personal assistance concerning activities of daily living, the use of various institutional services, and participation in groups.
	ILLUSTRATIVE TASKS
3A.1	Accompanies (escorts) client to service agency, expressing concern, interest, and encouragement, and making suggestions, in order to assist and support client in completing first steps of prescribed service plan (TB 107).
3A.2	Describes, answers questions, and encourages new families to use neighborhood services and facilities (stores, transportation, schools, health clinics, etc.) in order to help new families adjust to the community (TB 108).
3A.3	Converses with (talks to/listens to/responds to) worker about reported work problems (tardiness, absenteeism, interpersonal conflicts), empathizing and describing possible consequences (firing, suspension of pay, etc.), in order to help worker meet specified requirements (TB 109).
3A.4	Physically supports (lifts, holds, etc.) elderly wheelchair- or bed-patient in standing and walking to lavatory, empathizing and cajoling, in order to motivate and facilitate patient's movement to and from this area (TB 110).
3A.5	Asks questions, listens to responses of, and coaxes child to elaborate on his thoughts and feelings about himself and his family in order to find out how the child views himself in relation to parents and other family members (TB 111).

LEVEL	DEFINITION
	PERSUADING
3B	Influences others in favor of a product, service, or point of view by talks or demonstrations.
	ILLUSTRATIVE TASKS
3B.1	Describes and explains advantages and benefits of training program to client, relating benefits of program to client's need for money, training, and satisfying work, in order to induce client to enroll in the program (TB 112).
3B.2	Converses with parent(s) or guardian during home visit, emphasizing the importance and benefits of periodic health examinations for children and the advantages of using the local health clinic, in order to convince parent(s) to schedule checkup appointments for the children (TB 113).
3B.3	Speaks extemporaneously from prepared outline and notes to community groups, describing agency's foster family program and the kinds and numbers of children who need foster family homes, in order to persuade group members to submit applications for foster child placement (TB 114).

LEVEL	DEFINITION
	DIVERTING
3C	Amuses to entertain or distract individuals and/or audiences or to lighten a situation.
	ILLUSTRATIVE TASKS
3C.1	Talks to/engages/plays games with young children in recreation area while parent(s) attend conference in order to divert children's attention from absence of parent(s) (TB 115).
3C.2	Talks/chats with client while escorting him to Job Center for interview, selecting and narrating anecdotes and jokes about himself and others applying for jobs, in order to reduce nervous tension of client (TB 116).
3C.3	Talks/chats with patient prior to specialized physical therapy treatment, telling success stories and/or humorous incidents about other patients in similar situations, in order to reduce patient's fears and anxieties about treatment (TB 117).
3C.4	Entertains (talks to; selects and reads stories to; plays games with) ill or infirm child in order to provide diversion and lessen boredom due to confinement (TB 118).
3C.5	Talks with anxious, confused, and reluctant complainant, giving assurances, support, and expressing sympathy, in order to alleviate complainant's doubts/fears and put him at ease while he is making his complaint (TB 119).

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LEVEL	DEFINITION
	CONSULTING
4A	Serves as a source of technical information and gives such information or provides ideas to define, clarify, enlarge upon, or sharpen procedures, capabilities, or product specifications (e.g., informs individuals/families about details of working out objectives such as adoption, school selection, and vocational rehabilitation; assists them in working out plans and guides implementation of plans).
	ILLUSTRATIVE TASKS
4A.1	Gives information and ideas, based upon personal experience and training, to define and clarify outreach worker's duties for curriculum planners and instructors in order to recommend content and methods of training outreach workers (TB 120).
4A.2	States/discusses merits and demerits of project proposal in group discussion with state planners, answering questions, objections, and making suggestions, in order to sharpen planners' understanding of proposal requirements and to provide basis for improvements (TB 121).
4A.3	Gives advice to psychiatric social worker on particular case submitted for review, considering precedents/similar cases and literature in the field, in order to recommend alternate courses of treatment (TB 122).
4A.4	Meets with, talks to, answers questions, and discusses with nursing home administrators the mental health services which are available for their use in order to inform them of these resources (TB 123).
4A.5	Consults (talks; listens; discusses) with program specialists responsible for policy and procedures of statewide programs in order to help them resolve specific problems of interpretation of program guidelines (TB 124).
4A.6	Explains to supervisors the content of a new or modified program to be put into effect, answering questions/objections, and responding to their reservations and doubts, in order to increase their understanding of the program goals and to reduce resistance to and gain cooperation in implementation (TB 125).

LEVEL	DEFINITION
	INSTRUCTING
4B	Teaches subject matter to others or trains others, including animals, through explanation, demonstration, and test.
	ILLUSTRATIVE TASKS
4B.1	Acts out/demonstrates/role plays hostile client, extemporizing from a script outline, in order to establish the basis for subsequent discussion by student observers (TB 126).
4B.2	Presents informal lecture or talk on selected childrearing theories and practices to group of parents, illustrating major points with examples, and answering questions, in order to increase parents' understanding of concepts and techniques of childrearing (TB 127).
4B.3	Elicits/listens to/discusses opinions of trainees in seminar workshop on social problems in Area C, pointing out similarities and differences of viewpoints/opinions, in order to increase trainees' awareness and understanding of the complexity of these problems (TB 128).

LEVEL	DEFINITION
	TREATING*
4C	Acts on or interacts with individuals or small groups of people or animals who need help (as in sickness) to carry out specialized therapeutic or adjustment procedures. Systematically observes results of treatment within the framework of total personal behavior because unique individual reactions to prescriptions (chemical, physical, or behavioral) may not fall within the range of prediction. Motivates, supports, and instructs individuals to accept or cooperate with therapeutic adjustment procedures when necessary.
	ILLUSTRATIVE TASKS
4C.1	Hands/gives patient prescribed pills, assisting him as necessary; and takes readings of patient's temperature, blood pressure, and respiration, noting changes outside range of acceptable fluctuations, in order to carry out physician's prescription (TB 129).
4C.2	Demonstrates/directs/supports patient with arthritic hands in use of handloom, observing degree of finger movements and indications of pain, in order to increase flexibility/range of motion of fingers (TB 130).
4C.3	Describes/demonstrates prescribed exercises to patient with severe "low back" condition and guides/encourages him in performing exercises, observing and judging patient's movement in relation to norms and indications of pain, in order to relieve pain, increase relaxation, and restore mobility (TB 131).

*The *Treating* definition is intended to describe worker behavior typically performed in the healing-caring field represented by such occupations as nursing, occupational therapy, and physical therapy. While the illustrative tasks here (and the occupations in which they occur) may be encompassed in the broadest interpretation of "social welfare," tasks in the more specific field of *social work* which occur at level 4 on the scale seem to be more appropriately characterized as *Consulting* (4A) or *Instructing* (4B). The tasks included here illustrate the kinds of tasks involved in the *Treating* function.

LEVEL	DEFINITION
	SUPERVISING
5	Determines and/or interprets work procedure for a group of workers; assigns specific duties to them (delineating prescribed and discretionary content); maintains harmonious relations among them; evaluates performance (both prescribed and discretionary) and promotes efficiency and other organizational values; makes decisions on procedural and technical levels.
	ILLUSTRATIVE TASKS
5.1	Evaluates worker's performance of assigned tasks, examining task outcome against stated criteria and discussing assessment with worker, in order to interpret results of task performance for worker growth and to ensure that performance standards necessary to achieve objectives are met (TB 132).
5.2	Gives assignments and directs worker to conduct foster home studies, explaining/discussing Standard Operating Procedures and areas of discretion, based upon an evaluation of applications, workload, and competencies/strengths of worker, in order to ensure evaluation of foster homes according to objectives of organizational unit (TB 133).
5.3	Assigns tasks/gives directions to records clerk, explaining the prescribed and discretionary elements of procedures and performance requirements, based upon prior assessment of operational flow, workload, and worker's capability, in order to ensure effective storage and retrieval of client records (TB 134).
5.4	Evaluates/discusses, in individual conference, subordinate's use of discretion in conducting foster home study, explaining those aspects of task performance which exceeded or fell short of level of discretion expected, and judging content and consequences of discretionary decisions, in order to inform worker of results of his performance in relation to his growth and promotion (TB 135).

LEVEL	DEFINITION
	NEGOTIATING
6	Bargains and discusses on a formal basis as a representative of one side of a transaction for advantages in resources, rights, privileges, and/or contractual obligations, "giving and taking" within the limits provided by authority or within the framework of the perceived requirements and integrity of a program.
	ILLUSTRATIVE TASKS
6.1	States/argues agency's position with university representatives concerning substitution of work experience for university entrance requirements, bargaining over terms of substitution (type of work and amount), in order to obtain a letter of agreement from university officials sanctioning substitution (TB 136).
6.2	Advances/explains/defends proposal to change service procedures developed by group of consumers, answering objections and arguing against counterproposals, in order to arrive at formal agreement on modification of service program (TB 137).
6.3	Proposes/argues for/defends citywide antidiscrimination policy for welfare families to Board of Realtors, citing housing needs/long-run advantages to realtors, etc., in order to obtain formal agreement from represented realtor firms to rent to welfare families on a nondiscriminatory basis (TB 138).

LEVEL	DEFINITION
	MENTORING
7	Works with individuals having problems affecting their life adjustment in order to advise, counsel, and/or guide them according to legal, scientific, clinical, spiritual, and/or other professional principles. Advises clients on implications of analyses or diagnoses made of problems, courses of action open to deal with them, and merits of one strategy over another.
	ILLUSTRATIVE TASKS
7.1	Advises/counsels mother on emotional and legal consequences of decision to place her child in adoptive home, listening to, asking questions, and reflecting mother's feelings and suggesting ways of coping with problems, guilt, and anxieties arising from separation, in order to help mother adjust to permanent separation from child (TB 139).
7.2	Conducts counseling and therapeutic interviews with parents of teenagers convicted of drug addiction, guiding parents in gaining insight into their relationship with their children, and suggesting alternate approaches to the situation, in order to reduce parents' self-recrimination and help them cope with their situation (TB 140).

Things Function Scale

Things should be understood to refer to tangibles. In jobs where tangibles are not involved in a major way, they are at least present in the casual use of desk-top equipment (pencils, telephones, etc.) or such items as blackboards, chalk, etc. It is important to note that workers primarily involved with Data or People are also involved with tangibles in this way but on a very low level.* (See section IV for a more complete statement about Things.)

LEVEL	DEFINITION
	HANDLING
1A	Works (cuts, shapes, assembles, etc.), digs, moves, or carries objects or materials where objects, materials, tools, etc., are one or few in number and are the primary involvement of the worker. Precision requirements are relatively gross. Includes the use of dollies, handtrucks, and the like. (Use this rating for situations involving casual use of tangibles.)
	ILLUSTRATIVE TASKS
1A.1	Moves (pushes) empty hospital bed into ward at oral or written request of nurse in order to accommodate additional patient (TB 201).
1A.2	Hand-carries box of agency intake forms from service elevator in order to store forms on shelves on oral or written request of supervisor (TB 202).
1A.3	Pours glass of water from pitcher at patient's request and hands it to patient in order to assist him in drinking (TB 203).

*Workers (e.g., nonworking Foremen or Expediters) who make decisions and/or take action concerning the disposition of Things (tools, machines, materials, etc.) are considered in this respect to be working with Data (information, ideas). Working with Things means, literally, the physical interaction with Things.

LEVEL	DEFINITION
	FEEDING-OFFBEARING
1B	Inserts, throws, dumps, or places materials into, or removes them from, machines or equipment which are automatic or tended/operated by other workers. Precision requirements are built in, largely out of control of worker.
	ILLUSTRATIVE TASKS
1B.1	Removes hospital laundry from dryer at end of drying cycle and places it in clean laundry bag so that it is ready for pressingroom pickup (TB 204).
1B.2	Loads (places) paper into feeding rack of duplicating machine, following prescribed procedure, in order to prepare machine for operation (TB 205).
1B.3	Loads/places dirty dishes, pots, pans, and other cooking and eating utensils into automatic dishwasher in order to prepare machine for wash cycle (TB 206).

LEVEL	DEFINITION
	TENDING
1C	Starts, stops, and monitors the functioning of machines and equipment set up by other workers where the precision of output depends on keeping one to several controls in adjustment, in response to automatic signals according to specifications. Includes all machine situations where there is no significant setup or change of setup, where cycles are very short, alternatives to nonstandard performance are few, and adjustments are highly prescribed. (Includes electrostatic and wet-copying machines and PBX switchboards.)
	ILLUSTRATIVE TASKS
1C.1	Monitors (visually observes) operation of computer to ensure its proper functioning, periodically checking signal lights and other malfunction indicators, stopping computer, and calling systems analyst whenever a problem (program or mechanical) occurs (TB 207).
1C.2	Starts, stops, and monitors the operation of an automatic dishwasher, ensuring that it is working normally, in order to wash the clinic's cafeteria dishes (TB 208).
1C.3	Pushes button to start tape recorder, turning tone and volume controls to adjust respective indicator needles so that each is within its "normal" recording range, making adjustments as necessary during recording, and pushing stop button when conversation is finished, in order to record client interview (TB 209).

LEVEL	DEFINITION
	MANIPULATING
2A	Works (cuts, shapes, assembles, etc.), digs, moves, guides, or places objects or materials where objects, tools, controls, etc., are *several* in number. Precision requirements range from gross to fine. Includes waiting on tables and the use of ordinary portable power tools with interchangeable parts and ordinary tools around the home, such as kitchen and garden tools.
	ILLUSTRATIVE TASKS
2A.1	Cuts cooked meats into prescribed portions, using a variety of regular and/or electric carving knives, in order to prepare food for serving on cafeteria line (TB 210).
2A.2	Places overhead projector on small table, moving table back and forth until position and size of image are centered on screen, responding to lecturer's and participants' comments, then adjusting focus knob until transparency is clearly focused, in order to ready projector for use by lecturer (TB 211).
2A.3	Cuts through patient's plaster cast using a hand-held electric saw, adjusting speed and changing blades as necessary, in order to remove cast (TB 212).

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LEVEL	DEFINITION
	OPERATING-CONTROLLING
2B	Starts, stops, controls, and adjusts a machine or equipment designed to fabricate and/or process data, people, or things. The worker may be involved in activating the machine, as in typing or turning wood, or the involvement may occur primarily at startup and stop as with a semiautomatic machine. *Operating a machine* involves readying and adjusting the machine and/or material as work progresses. *Controlling equipment* involves monitoring gauges, dials, etc., and turning valves and other devices to control such items as temperature, pressure, flow of liquids, speed of pumps, and reactions of materials. *Includes the operation of typewriters, mimeograph machines, and other office equipment where readying or adjusting the machine requires more than cursory demonstration and checkout.* (This rating is to be used only for operations of one machine or one unit of equipment.)
	ILLUSTRATIVE TASKS
2B.1	Types case record for agency files, using handwritten draft as a guide, setting up and making adjustments to the typewriter (margin, spacing, etc.) and the copy to achieve prescribed agency format (TB 213).
2B.2	Runs (operates) mimeograph machine to make fliers for neighborhood distribution, checking to determine that machine is in working order, adjusting for size and margins of paper, cleaning roller, checking and refilling with fluid if necessary, inserting the stencil, running off copies by hand-turning the drum, and making minor adjustments during the printing (TB 214).
2B.3	Sets up, starts, stops, and controls the operation of a closed-circuit TV camera, making the necessary focus adjustments and changing the camera angles to record on TV tape a training session to be used for teaching purposes (TB 215).

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LEVEL	DEFINITION
	DRIVING-CONTROLLING
2C	Starts, stops, and controls the actions of machines for which a course must be steered or guided in order to fabricate, process, and/or move things or people. Actions regulating controls require continuous attention and readiness of response. (Use this rating if use of vehicle is required in job, even if job is concerned with people or data primarily.)
	ILLUSTRATIVE TASKS
2C.1	Drives a small battery-powered delivery van through hallways and between buildings of a hospital, stopping at designated locations, in order to pick up and load containers of dirty laundry into van for delivery to washing room (TB 216).
2C.2	Drives agency automobile to welfare client's house to pick up and drive him to clinic to keep medical appointment, assisting him as necessary to and from the car (TB 217).
2C.3	Drives day care center bus along prescribed route, stopping at designated addresses at prescribed times, calling on clients and assisting them to bus, if necessary, in order to bring clients to day care center for treatment (TB 218).

LEVEL	DEFINITION
	PRECISION WORKING
3A	Works, moves, guides, or places objects or materials according to standard practical procedures where the number of objects, materials, tools, etc., embraces an entire craft and accuracy expected is within final finished tolerances established for the craft. (Use this rating where work primarily involves manual or power hand-tools.)
	ILLUSTRATIVE TASKS
3A.1	Makes transparencies for overhead projector to provide visual materials that will assist lecturer by cutting the materials, drawing and lettering the design, using experience and knowledge and a full range of techniques and tools; e.g., photographic and lettering (TB 219).
3A.2	Manipulates (physically arranges) broken bones in damaged limb, applying splints and wrappings, in order to set bones in natural position for healing (TB 220).

LEVEL	DEFINITION
	SETTING UP
3B	Installs machines or equipment; inserts tools; alters jigs, fixtures, and attachments; and/or repairs machines or equipment to ready and/or restore them to their proper functioning according to job order or blueprint specifications. Involves primary responsibility for accuracy. May involve one or a number of machines for other workers or for worker's own operation.
	ILLUSTRATIVE TASKS
3B.1	Sets up occupational therapy center, drawing upon manuals, training, and experience; oversees arrangements for such equipment and materials (e.g., weaving, leatherworking, and tilesetting) to permit their accessibility for individual or group work in order to provide activities for patients with physical and/or emotional problems (TB 221).
3B.2	Oversees installation of computer units, determining and supervising the positioning of units by other personnel, with reference to blueprints, layout specifications, and personal experience; and makes trial machine runs to sort out startup problems in order to ensure effective operation of new computer center (TB 222).

Appendix A

Scale of Worker Instructions

LEVEL	DEFINITION
1	Inputs, outputs, tools, equipment, and procedures are all specified. Almost everything the worker needs to know is contained in his assignment. He is supposed to turn out a specified amount of work or a standard number of units per hour or day.
2	Inputs, outputs, tools, and equipment are all specified, but the worker has some leeway in the procedures and methods he can use to get the job done. Almost all the information he needs is in his assignment. His production is measured on a daily or weekly basis.
3	Inputs and outputs are specified, but the worker has considerable freedom as to procedures and timing, including the use of tools and equipment. He has to refer to several standard sources for information (handbooks, catalogs, wall charts). Time to complete a particular product or service is specified, but this varies up to several hours.
4	Output (product or service) is specified in the assignment, which may be in the form of a memorandum or of a schematic (sketch or blueprint). The worker must work out his own ways of getting the job done, including selection of tools and equipment, sequence of operations (tasks), and obtaining important information (handbooks, etc.). He may either carry out work himself or set up standards and procedures for others.
5	Same as (4) above, but in addition the worker is expected to know and employ theory so that he understands the whys and wherefores of the various options that are available for dealing with a problem and can independently select from among them. He may have to do some reading in the professional and/or trade literature in order to gain this understanding.

LEVEL	DEFINITION
6	Various possible outputs are described that can meet stated technical or administrative needs. The worker must investigate the various possible outputs and evaluate them in regard to performance characteristics and input demands. This usually requires his creative use of theory well beyond referring to standard sources. There is no specification of inputs, methods, sequences, sources, or the like.
7	There is some question as to what the need or problem really is or what directions should be pursued in dealing with it. In order to define it, to control and explore the behavior of the variables, and to formulate possible outputs and their performance characteristics, the worker must consult largely unspecified sources of information and devise investigations, surveys, or data analysis studies.
8	Information and/or direction comes to the worker in terms of needs (tactical, organizational, strategic, financial). He must call for staff reports and recommendations concerning methods of dealing with them. He coordinates both organizational and technical data in order to make decisions and determinations regarding courses of action (outputs) for major sections (divisions, groups) of his organization.

Scales of General Educational Development*

Reasoning Development Scale

The Reasoning Development Scale is concerned with knowledge and ability to deal with theory versus practice, abstract versus concrete, and many versus few variables.

LEVEL	DEFINITION
1	• Have the common sense understanding to carry out simple one- or two-step instructions in the context of highly standardized situations. • Recognize unacceptable variations from the standard and take emergency action to reject inputs or stop operations.
2	• Have the common sense understanding to carry out detailed but uninvolved written or oral instructions. • Deal with problems involving a few concrete variables in or from standardized situations.
3	• Have the common sense understanding to carry out instructions furnished in written, oral, or diagrammatic form. • Deal with problems involving several concrete variables in or from standardized situations.
4	• Have knowledge of a system or interrelated procedures, such as bookkeeping, internal combustion engines, electric wiring systems, nursing, farm management, ship sailing, or machining. • Apply principles to solve practical, everyday problems and deal with a variety of concrete variables in situations where only limited standardization exists. • Interpret a variety of instructions furnished in written, oral, diagrammatic, or schedule form.
5	• Have knowledge of a field of study (engineering, literature, history, business administration) having immediate applicability to the affairs of the world. • Define problems, collect data, establish facts, and draw valid conclusions. • Interpret an extensive variety of technical material in books, manuals, texts, etc. • Deal with some abstract but mostly concrete variables.

*These scales have been modified and adapted by Sidney A. Fine from a table of "General Educational Development" in third edition, *Dictionary of Occupational Titles*, Vol. II (Washington: 1965), p. 652.

LEVEL	DEFINITION
6	• Have knowledge of a field of study of the highest abstractive order (e.g., mathematics, physics, chemistry, logic, philosophy, art criticism). • Deal with nonverbal symbols in formulas, equations, or graphs. • Understand the most difficult classes of concepts. • Deal with a large number of variables and determine a specific course of action (e.g., research, production) on the basis of need.

Mathematical Development Scale

The Mathematical Development Scale is concerned with knowledge and ability to deal with mathematical problems and operations from counting and simple addition to higher mathematics.

LEVEL	DEFINITION
1	• Counting to simple addition and subtraction; reading, copying, and/or recording of figures.
2	• Use arithmetic to add, subtract, multiply, and divide whole numbers.
3	• Make arithmetic calculations involving fractions, decimals, and percentages.
4	• Perform ordinary arithmetic, algebraic, and geometric procedures in standard practical applications.
5-6	• Have knowledge of advanced mathematical and statistical techniques such as differential and integral calculus, factor analysis, and probability determination. • Work with a wide variety of theoretical mathematical concepts. • Make original applications of mathematical procedures, as in empirical and differential equations.

Language Development Scale

The Language Development Scale is concerned with knowledge and ability to deal with oral or written language materials from simple instructions to complex sources of information and ideas.

LEVEL	DEFINITION
1	• Cannot read or write but can follow simple oral, "pointing-out" instructions. • Sign name and understand ordinary, routine agreements when explained, such as those relevant to leasing a house; employment (hours, wages, etc.); procuring a driver's license. • Read lists, addresses, safety warnings.
2	• Read comic books, "true confession" or "mystery" type magazines (short sentences; simple, concrete vocabulary; words that avoid complex Latin derivations). • Converse with service personnel (waiters, ushers, cashiers). • Copy verbal records precisely without error. • Keep taxi driver's trip record.
3	• Read material on level of the *Reader's Digest* and straight news reporting in popular "mass" newspapers. • Comprehend ordinary newscasting (uninvolved sentences and vocabulary with focus on events rather than on their analysis). • Copy verbal material from one record to another, catching gross errors in grammar. • Fill in report forms, such as Medicare forms, employment applications, and card form for income tax. • Conduct house-to-house surveys to obtain common census-type information or market data, such as preferences for commercial products in everyday use.

LEVEL	DEFINITION
4	• Have language ability to take and transcribe dictation, make appointments, and sort, route, and file the mail according to subject. • Write routine business correspondence reflecting standard procedures. • Interview job applicants to determine work best suited for their abilities and experience; contact employers to interest them in services of agency. • Understand technical manuals and verbal instructions, as well as drawings and specifications, associated with practicing a craft. • Guide people on tours through historical or public buildings, tell relevant anecdotes, etc. • Conduct opinion research surveys involving stratified samples of the population.
5	• Write instructions for assembly of prefabricated parts into units. • Write instructions and specifications concerning proper use of machinery. • Write copy for advertising. • Report news for the newspapers, radio, or TV. • Prepare and deliver lectures for audiences that seek information about the arts, sciences, and humanities in an informal way. • Report, write, or edit articles for magazines which, while popular, are of a highly literate nature (e.g., *New Yorker, Saturday Review, Scientific American*).
6	• Report, write, or edit articles for technical and scientific journals or journals of advanced literary criticism (e.g., *Journal of Educational Sociology, Science, Physical Review, Daedalus*). • Prepare and draw up deeds, leases, wills, mortgages, and contracts. • Prepare and deliver lectures on politics, economics, education, or science to specialized students and/or professional societies. • Comprehend and apply technical engineering data for designing buildings and bridges. • Comprehend and discuss literary works of a highly symbolic nature, such as works in logic and philosophy (e.g., Kant, Whitehead, Russell).

Appendix B

The Role of Functional Job Analysis in Current Manpower Problems[1]

by

Sidney A. Fine

Functional Job Analysis (FJA)[2,3,4,5] is 21 years of age this year — an age when it is traditional to size up, evaluate, and consider: What do we have here? Let us first identify this phenomenon, recount its history, and then consider some of the problems to which it has addressed itself.

Functional Job Analysis is probably three things: (1) a conceptual system defining dimensions of work activity and thus a way of conceiving the world of work, (2) an observational method and thus a way of looking at people at work, and (3) a method of analysis — of evaluating the design of work and its performance. It isn't always easy to separate these three things. Perhaps FJA is always all three with merely the emphasis changing as it addresses itself to different problems. In any case, we shall proceed to describe it in this way and see where it leads.

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[1]Introductory talk to a symposium on Functional Job Analysis at the American Personnel and Guidance Association-National Guidance Association convention, Las Vegas, Nevada, April 1, 1969. It has been slightly edited to bring it up to date.

[2]Sidney A. Fine, "A pilot study to develop a functional classification structure of occupations," a paper presented at American Psychological Association Convention, Chicago, Illinois, September 1951.

[3]Fine, "Functional Job Analysis," *Personnel Administration and Industrial Relations,* spring 1955.

[4]Fine, "A Structure of Worker Functions," *Personnel and Guidance Journal,* October 1955.

[5]Fine and C. A. Heinz, "Estimates of Worker Trait Requirements," *Personnel and Guidance Journal,* November 1957.

Description of FJA

A Conceptual System

The primary elements in the FJA conceptual system are the following:

1. A fundamental distinction must be made between *what gets done* and *what workers do* to get work done. We too often ascribe the former to the latter and as a result confuse our thinking concerning what goes on in a job right from the start. Thus, the bus driver does not carry passengers; what he does is perform a number of sequenced tasks to drive a vehicle and collect fares. We must not confuse the technology of economics and engineering with the behavior of people.

2. What workers do, insofar as their job content is concerned, they do in relation to three primitives: Things, Data, and People.

3. In relation to each primitive, workers function in unique ways. Thus, in relation to Things, workers draw on physical resources; in relation to Data, on mental resources; and in relation to People, on interpersonal resources.

4. All jobs require the worker to relate to each of these primitives in some degree.

5. Although the behavior of workers or the tasks performed by them can apparently be described in an infinite number of ways, there are only a small number of definitive functions involved. Thus, in interacting with machines, workers function to feed, tend, operate, or set up; and in the case of vehicles or related machines, to drive-control them. Although each of these functions occurs over a range of difficulty and content, essentially each draws on a relatively narrow and specific range of similar kinds and degrees of worker characteristics and qualifications for effective performance.

6. The functions appropriate to each primitive are hierarchical and ordinal, proceeding from the simple to the complex. Thus,

to indicate a particular function, say compiling (data), as reflecting the requirements of a job is to say that it includes the requirements of lower functions such as comparing and excludes the requirements of higher functions such as analyzing.

7. The three hierarchies provide two measures for a job:

   Level: This is a measure of relative complexity in relation to Things, to Data, and to People.

   Orientation: This is a measure of relative (proportional) involvement with Things, Data, and People.

8. *Prescription and Discretion:* The hierarchies of functions reflect a progression from much prescription and little discretion in worker instructions at the least complex level to much discretion and little prescription at the most complex level.

9. Human performance is conceived as involving three types of skills: adaptive, functional, and specific content:

   Adaptive Skills refer to those competencies that enable an individual to manage the demands for conformity and/or change in relation to the physical, interpersonal, and organizational arrangements and conditions in which a job exists. Included are management of oneself in relation to authority; to impulse control; to moving towards, away from, or against others; to time (e.g., punctuality and self-pacing); to care of property; to dress (e.g., style and grooming). These skills, rooted in temperament, are normally acquired in the early developmental years, primarily in the family situation and among one's peers and reinforced in the school situation.

   Functional Skills refer to those competencies that enable an individual to relate to Things, Data, and People (orientation) in some combination according to personal preferences and to some degree of complexity appropriate to abilities (level). They include skills like tending or operating machines; comparing, compiling, or analyzing data; and exchanging information with or consulting and supervising people. These skills

are normally acquired in educational, training, and avocational pursuits and are reinforced in specific job situations.

Specific Content Skills refer to those competencies that enable an individual to perform a specific job according to the standards required to satisfy the market. These skills are normally acquired in an advanced technical training school or institute, by extensive on-the-job experience, or on a specific job. They are as numerous as specific products, services, and employers who establish the standards and conditions under which those products and services are produced.

In effect, the degree to which a worker can use his functional skills effectively on a job is dependent on the degree to which his adaptive skills enable him to accept and relate to the specific content skill requirements.

An Observational Method

In analyzing workers on the job, the observer must recognize that:

1. He will readily see only the figure — the action in the foreground — the specific content, and perhaps not all of that; therefore,
2. He must observe by probing the background for information concerning:
   a. The functional involvement with all three primitives; i.e., level and orientation.
   b. The nature of the instructions — what is prescribed and what is discretionary.
   c. The specific conditions requiring adaptive skills.
   d. The functional level of educational requirements.
   e. The specific knowledge areas involved and resources immediately available for acquiring information.
   f. The methods by which standards are achieved.

Seven ordinal scales have been developed in FJA which can be used as guidelines to establish functional, instructional, and educational requirements. Personnel people in industry who had previously never heard of FJA learned and applied the scales to a range of production, maintenance, and clerical jobs in a few hours, averaging three minutes per job for both learning and applying the scales.

Functional Job Analysis Self-Reports for specific occupational titles, such as engineer, biochemist, and vocational counselor, which elicit most of the information specified above, are completed by individuals in about an hour and a half. Self-Reports have been developed for about a dozen work fields such as engineering, counseling, physical therapy, and administration.

A Method of Analysis

Analysis fundamentally refers to examination and evaluation in order to determine options, to make choices, and to achieve standards. In order for such examination and evaluation to take place, criteria are required. Criteria are of two kinds — those that tell us that we're making progress towards our goal and those that tell us the condition we're in for getting there.

FJA has been useful as an analytical tool because it conceptualizes both the whole and the parts of human performance and purports to define all possible ways of human functioning. Thus, it provides a criterion for determining the adequacy of job analysis information, whether gathered by FJA or some other method. For example, it in effect states that unless a job analysis provides information that indicates level of involvement with Things, Data, and People, it is incomplete. Similarly, it provides a criterion for performance evaluation insofar as it specifies and defines an expected functional performance of a particular worker. In this connection, FJA distinguishes among functional, adaptive, and specific content skill requirements, positing differing standards of performance for each.

By conceptualizing the range and kinds of functions that enter

into system execution, FJA becomes an adjunct to system analysis.[6] Since systems are goal-oriented, it is possible to use the functional concepts in conjunction with a system's technological potentialities as an armamentarium of alternative means for achieving goals. Thus, different functions, in effect, require different technological means, and the possibility of tradeoffs and cost/benefit analysis emerges.[7]

Another use of FJA for analysis is in synthetic validity[8] — that is, the determination of selection criteria on the basis of the nature of the function and known experience in testing for the function with specific tests of abilities. Developing validity criteria on an empirical basis is often neither feasible nor entirely desirable — particularly if tests are not relevant for certain types of applicants or if no adequate tests exist for certain types of factors.

History of FJA

Although the conceptualization of FJA for research was initiated in 1948, it was first presented as an approach to job analysis and occupational classification by me in a paper given at the American Psychological Association convention in 1951. Its immediate roots were in my experience in job family and test development work at the United States Training and Employment Service (USTES) before and immediately after World War II and in the analysis and classification of all military occupational specialties during the war. The job family work under the direction of William Stead and Carroll Shartle at USTES provided some very significant ideas, particularly the use of gerunds for exploring relationships. Theoretical inspiration came from the work and question formulation of Morris Viteles and Donald Patterson.

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[6]Wretha W. Wiley and Sidney A. Fine, *A Systems Approach to New Careers: Two Papers* (Kalamazoo, Michigan: The Institute, November 1969).

[7]Fine, "A Systems Approach to Task Analysis and Job Design," an Upjohn Institute seminar-workshop.

[8]Fine, *Functional Job Analysis as a Method of Indirect Validation: A Study in Synthetic Validity,* unpublished doctoral dissertation, The George Washington University, June 1962.

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The major opportunity for developing these ideas came from Air Force support to the USTES for two years, 1951-1953, in exploring the application of the concepts for a new occupational classification system to be developed on a theoretical basis, rather than, as formerly, on a strictly empirical basis.

The period between 1951 and 1959 was one of intensive research involving, particularly, the analysis of 4,000 jobs according to eight components — aptitudes, interests, temperament, physical capacities, working conditions, training time, work performed, and industry. The first major publication on this work appeared in 1956 when all the data for the 4,000 jobs, with the exception of the data on work performed, were published in the notorious "Green Monster."[9] Inelegant as the title was, it did not interfere with the document's becoming a bestseller. It is now out of print and unnecessary since the supplements to the third edition of the *DOT*[10] contain the same kind of information.

During the decade of the 1950's, FJA was an input to military classification, perhaps playing a small part in the functional nature of some of the emerging military classification systems, particularly that of the Air Force.[11] It was also the period during which research was carried out to establish the usefulness of many of the FJA concepts, such as the operational approach to defining temperament,[12] the twofold approach taken to education and training,[13] the bipolar approach to interests proposed by William Cottle, and the exploration of the relationship between worker-trait profiles and functional patterns. All of this was input to the ultimate 1965 third edition of

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[9]U.S. Department of Labor, *Estimates of Worker Trait Requirements for 4,000 Jobs* (Washington: Government Printing Office, 1956).

[10]U.S. Department of Labor, *Dictionary of Occupational Titles,* third edition, Vols. I, II (Washington: Government Printing Office, 1965).

[11]J. E. Morsh and F. R. Ratliff, *Occupational Classification in Some Major Government Agencies,* ASTIA Document No. AD 212-540, USAF, March 1959.

[12]J. Boling and Sidney A. Fine, "A Study of Cues Used by Raters in the Rating of Temperament Requirements," *Journal of Applied Psychology,* 1959, 43 (2).

[13]Fine, *Use of the Dictionary of Occupational Titles To Estimate Educational Investment,* reprinted from *The Journal of Human Resources,* Vol. III, No. 3 (Summer 1968) (Kalamazoo, Michigan: The Institute, August 1968).

the *DOT,* which incorporated Functional Job Analysis concepts into the new occupational classification structure.

Since 1965 FJA has been the basis for increasingly intensive research. This symposium will present some of the research going on today.

Problems and Applications

FJA or some aspect of it has been used as a basis for dealing with a number of problems in the manpower, personnel management, and vocational counseling fields. Only a sampling of these can be indicated here.

The USTES incorporated the FJA conceptual system in its occupational classification structure in order to facilitate the matching of men and jobs. The new two-part code assigned to an individual reflects both the work field and the functional pattern with which he is experienced. Thus, he can be matched to either or both, vastly increasing his accessibility via classification to occupational opportunities. One of my staff papers is a full treatment of the significance of the innovations in the third edition of the *DOT.*[14]

The FJA method of measuring general educational development and specific vocational preparation is particularly useful in the problem of estimating educational investment. This is a problem of great moment to developing nations, and an explication of the use of FJA for this purpose is available in another Upjohn Institute publication.[15]

Manpower shortages in scientific and human service fields have accelerated the need for comprehensive manpower analysis and planning approaches that would enable these fields to accomplish a number of specific objectives, such as promoting greater utilization of highly developed skills, providing for lower level subprofessional jobs, and defining job lattices within a work field to maximize opportunities for entering on and pursuing a career. Levin and

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[14]*The 1965 Third Edition of the Dictionary of Occupational Titles — Content, Contrasts, and Critique* (Kalamazoo, Michigan: The Institute, December 1968).

[15]See footnote 13.

Martin[16] used FJA in this manpower context in their study of bioscientists and instructional media personnel. Szaloczi has found FJA useful in conceptualizing and generating research for the manpower situation in the social welfare field.[17] I have analyzed physical therapy jobs to determine tasks that could be performed by nonprofessionally prepared individuals.[18]

A closely related problem is developing or reassessing curriculum content for existing professional fields or new careers. Both Sjogren[19] and the Human Resources Research office have used FJA for this purpose to evaluate vocational-technical education curricula. It has also been used in this connection to examine the relevance of occupational therapy curricula for occupational therapy job requirements.

In personnel management, the Functional Job Analysis Self-Report[20] has been used to gather current data on what research and development personnel were doing. These reports have also been used to provide objective data on performance beyond expectation to justify annual merit wage increases. The Applied Physics Laboratory of The Johns Hopkins University has explored and made progress in computerizing its personnel management system, associating brief FJA descriptions with an individual's personnel record.

Vocational counseling involves the crucial problem of establishing relevance between personal background information and a field of work. Two interest inventories use FJA for this purpose.[21, 22] I

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[16]L. S. Levin and A. M. Martin, "Study of manpower needs in the basic health sciences, phase II, section I — the development of functional analysis for studies of manpower problems," USPHS (RG-7333)FASEB, Washington, D.C., 1963.

[17]J. K. Szaloczi, "Application of Job Analysis to Social Welfare," unpublished paper presented at symposium mentioned in footnote 1.

[18]*Job Analysis of Physical Therapists to Develop Curriculum Material for an Aide Training Program* (McLean, Virginia: Human Sciences Research, Inc., November 1963), and published as Final Report No. HSR-RP-63/19 for the Michigan Department of Health.

[19]D. Sjogren, "A Functional Approach to Curriculum Development," a paper delivered at the symposium mentioned in footnote 1.

[20]R. A. Dickmann, *Handbook for Supporting Staff: Job Analysis and Job Evaluation,* The Johns Hopkins University Applied Physics Laboratory, 1970 (limited distribution).

[21]A. G. D'Costa, "The Development of the Ohio Vocational Interest Survey," a paper delivered at the symposum mentioned in footnote 1.

[22]L. G. Hall, *Hall Occupational Orientation Inventory* (Chicago: Follett Educational Corporation, 1968).

have developed and demonstrated a Things, Data, People Counseling Interview[23] which bases itself squarely on the FJA primitives and the current *DOT*. In the near future its use will be explored for group counseling.

The *DOT* worker-trait groups use FJA concepts to bring jobs into job families having common worker-trait profiles. For the first time, this provides at least a start at realizing the goal defined by Donald Patterson a generation ago; namely, that of being able to indicate to an individual all of the job situations for which his potential suits him. A superb document toward this end based squarely on FJA concepts is the *Counselor's Handbook* recently published by the Department of Labor.[24]

Two additional problems to which FJA has addressed itself are of interest. In 1968 I explored the feasibility of developing a functional method for the reporting of industrial manpower. Manpower statistics are now reported by selected job titles based either on the Census or on the *DOT*.[25] The FJA method not only proved to be feasible, but was demonstrably more valid. Personnel directors making the reports also felt that the FJA method was useful to them for other personnel functions. Recently in a further exploration of the usefulness of FJA concepts, the Office of Management and Budget reanalyzed the October 1966 *Current Population Survey* according to the classification system in the current *DOT*. As might have been anticipated from the previously mentioned research, this study provides the labor force with a "new look" in some depth. For example, new light is shed on the different job functions performed by males and females, on the nature of semiskilled occupations (more often than not actually no different from unskilled), and on the incongruity between educational requirements and educational attainment.

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[23]"Things, Data, People Counseling Interview," unpublished paper and demonstration, American Vocational Association Convention, Dallas, Texas, December 13, 1968.

[24]U.S. Department of Labor, *Counselor's Handbook*, by J. Boling (Washington: Government Printing Office, 1967).

[25]Fine, *The Feasibility of a Direct Method of Obtaining Manpower Data* (Kalamazoo, Michigan: The Institute, November 1968), mimeographed.

As noted in the introduction to the report:[26] "A preliminary analysis of distributions under the functional hierarchies developed by the Employment Service, as they appear when applied to the labor force suggests a possible future direction for the Development of a Standard Occupational Classification."

I also adapted the FJA method to conduct two of the handful of studies that have been attempted to measure changes in job requirements as a result of automation.[27,28] The former of the two was an input to the *Report of the National Commission on Technology, Automation, and Economic Progress.*

Conclusion

FJA is still growing and developing. Most of the growth occurs as a result of analysis and criticism made by scholars and practitioners coming to grips with personnel and manpower problems. Surely further critical appraisal will emerge as a result of today's presentations and discussion. To me, the wonder of it has been that FJA is still viable and still heuristic. It isn't important that it survive in its present form; it is important that it be able to lead us to higher ground and better understanding. With this in mind, I should like to dedicate this symposium on FJA to its critics.

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[26]Ann Miller, *Occupations of the Labor Force According to the Dictionary of Occupational Titles,* Statistical Evaluation Report No. 9, Office of Manpower and Budget, Executive Office of the President, Washington, D.C., February 1971.

[27]*The Nature of Automated Jobs and Their Educational and Training Requirements* (McLean, Virginia: Human Sciences Research, Inc., June 1964), and published as Final Report No. HSR-RR-64/6-Ae for the Office of Manpower, Automation, and Training, U.S. Department of Labor, under contract No. OAM-3-63.

[28]Fine and R. J. Teare, *A Study to Explore the Correlates of Physical and Mental Health of Workers Before and After the Introduction of Automation* (McLean, Virginia: Human Sciences Research, Inc., May 1965), and published as Final Report No. HSR-RR-65/3-Hh for the Division of Occupational Health, Public Health Service, U.S. Department of Health, Education, and Welfare, under contract No. PH86-64-120.